

BARRIE AREA TRANSMISSION UPGRADE

CLASS ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL STUDY REPORT

Report Number: 590-CLEA-18- -2

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March 2018

Report Number: 590-CLEA-18- -2
Hydro One Networks Inc.
Environmental Services
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EXECUTIVE SUMMARY

Hydro One Networks Inc. (Hydro One) has prepared this Environmental Study Report (ESR) for the upgrade of the transmission infrastructure located in the Township of Springwater and City of Barrie. The upgrade of this transmission infrastructure is referred to as the Barrie Area Transmission Upgrade (herein referred to as “the proposed Project”). The proposed Project is required to replace equipment that has reached its end of life and to meet the region’s growing electricity demand. The proposed Project will involve replacing two existing single-circuit 115 kilovolt (kV) transmission lines and wooden H-frame structures with a new double-circuit 230 kV transmission line and steel structures along the existing transmission right-of-way, and replace equipment at Essa Transformer Station (TS) and Barrie TS which is nearing its end of life. The transmission line upgrade was identified as a near-term initiative in the Independent Electricity System Operator’s (IESO) Barrie/Innisfil Integrated Regional Resource Planning process to ensure an adequate and reliable supply of electricity to the region.

The proposed Project is subject to the Class Environmental Assessment for Minor Transmission Facilities (Class EA) (Hydro One, 2016) in accordance with the Ontario *Environmental Assessment Act* (EA Act). This ESR has been prepared in compliance with the requirements of the EA Act and describes the Class EA process that has been undertaken for the proposed Project.

At the onset of the proposed Project, the technical specification and system requirement that would meet the need identified by the IESO was determined and a study area was defined. The Class EA process for the Barrie Area Transmission Upgrade included an assessment of the environmental features within the study area. Resources were identified from literature reviews, reports (e.g., Stage 1 and Stage 2 archaeological assessments) and technical memos commissioned by Hydro One, databases, mapping, consultation and/or field surveys.

Since late 2016, Hydro One has conducted comprehensive consultation regarding the proposed Project with municipal and provincial government officials and agencies; First Nation communities; potentially affected and interested persons and interest groups to inform them of the proposed Project, as well as to identify and resolve potential concerns.

The consultation process included Public Information Centres in the Township of Springwater and City of Barrie, which provided opportunities for interested parties to discuss with and pose questions to the Hydro One project team and complete comment forms; meetings with key stakeholders; and the establishment and maintenance of a project website.

Potential environmental effects resulting from the project have been identified on certain environmental features, and avoidance and/or mitigation measures have been proposed accordingly. There may be instances where residual environmental effects remain even with the application of mitigation measures; the residual effects identified to date are primarily temporary (e.g., would only occur throughout the construction period) and are not significant.

The draft ESR was made available for public review and comment for 30 calendar days, from January 29, 2018 until 4:30 p.m. on February 27, 2018.

Comments received from government agencies and officials, First Nation communities, potentially affected and interested persons, and interest groups during this period were addressed and are documented in this ESR, as required by the Class EA process. No Part II Order requests were received to elevate this project from a Class EA to an Individual EA.

Through filing this ESR with the Ministry of Environment and Climate Change, Hydro One has satisfied the requirements of the provincial *Environmental Assessment Act*. The proposed Project outlined in this ESR is considered acceptable.

The proposed Project will be implemented in full compliance with the requirements of the Class EA process as outlined in this ESR, incorporating input obtained throughout the planning process including the consultation plan. Hydro One will obtain the necessary environmental approvals and permits required for the proposed Project.

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LIST OF ACRONYMS & ABBREVIATIONS

AAQC	Ambient Air Quality Criteria
ANSI	Area of Natural and Scientific Interest
CAAQS	Canadian Ambient Air Quality Standards
CAO	Chief Administrative Officer
CCME	Canadian Council of Ministers of the Environment
Class EA	Class Environmental Assessment for Minor Transmission Facilities, 2016
CLI	Canada Land Inventory
CO	Carbon Monoxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
°C	Degrees Celsius
EA	Environmental Assessment
EA Act	<i>Environmental Assessment Act</i>
EAB	Environmental Approvals Branch
EASR	Environmental Activity and Sector Registry
ECCC	Environment and Climate Change Canada
ELC	Ecological Land Classification
EMF	Electric and Magnetic Fields
ESR	Environmental Study Report
FLR	Field Liaison Representative
FPTRPC	Federal Provincial Territorial Radiation Protection Committee
GPS	Global Positioning System
Ha	Hectare
HVA	Highly Vulnerable Aquifer
Hydro One	Hydro One Networks Inc.
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IESO	Independent Electricity System Operator

IRRP	Integrated Regional Resource Planning
km	Kilometre
km ²	Square Kilometre
kV	Kilovolt
L/min	Litres per Minute
LIO	Land Information Ontario
LSRCA	Lake Simcoe Region Conservation Authority
m	Metre
m ²	Square Metre
m ³ /day	Cubic Metres per Day
m/s	Metre per Second
masl	Metres above Sea Level
MBCA	<i>Migratory Birds Convention Act, 1994</i>
mbgs	Metres Below Ground Surface
mG	Milligauss
mm	Millimetre
MNDM	Ministry of Northern Development and Mines
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MTCS	Ministry of Tourism, Culture and Sport
MTO	Ministry of Transportation
MVA	Mega Volt Ampere
NAPS	National Air Pollution Surveillance
NHIC	Natural Heritage Information Centre
NO ₂	Nitrogen Dioxide
NVCA	Nottawasaga Valley Conservation Authority
NVWSPA	Nottawasaga Valley Watershed Source Protection Area
NVSPA-AAR	Nottawasaga Valley Source Protection Area Approved Assessment Report
O. Reg.	Ontario Regulation
OEB	Ontario Energy Board

OEB Act	<i>Ontario Energy Board Act</i>
OPGW	Optical Ground Wire
OWES	Ontario Wetland Evaluation System
PIC	Public Information Centre
PM _{2.5}	Particles of 2.5 micrometres or less
PM ₁₀	Particles of 10 micrometres or less
PPS	Provincial Policy Statement, 2014
PSW	Provincially Significant Wetland
PTTW	Permit to Take Water
PWQMN	Provincial Water Quality Monitoring Network
SAC	MOECC Spills Action Centre
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
SARO	Species at Risk in Ontario
SO ₂	Sulphur Dioxide
SPM	Suspended Particulate Matter
TS	Transformer Station
V/m	Volt per Metre
WHPA	Wellhead Protection Area
WWIS	Water Well Information System
µg/m ³	Microgram per Cubic Metre

1 Introduction

Hydro One Networks Inc. (Hydro One) is planning to upgrade two existing single-circuit 115 kilovolt (kV) transmission lines (circuits E3B and E4B) to one new double-circuit 230 kV transmission line from Essa Transformer Station (TS) to Barrie TS in the Township of Springwater and City of Barrie. The project will also involve the replacement and/or upgrade of equipment at Essa TS and Barrie TS that is approaching its end of life. The upgrade is referred to as the Barrie Area Transmission Upgrade (herein referred to as “the proposed Project”). The purpose of the proposed Project is to replace equipment that is approaching its end of life and to meet the region’s growing electricity demand. The location of the proposed Project is shown in Figure 1-1.

An environmental assessment (EA) was carried out to assess the potential environmental effects of the proposed Project. This Environmental Study Report (ESR) has been prepared in accordance with the requirements of the Ontario *Environmental Assessment Act* (EA Act). The proposed Project is subject to the Class Environmental Assessment for Minor Transmission Facilities (Class EA) (Hydro One, 2016), which was approved under the EA Act. The Class EA was developed as a streamlined process to ensure minor transmission projects that have a predictable range of effects are planned and carried out in an environmentally acceptable manner. This ESR describes the Class EA process that has been undertaken for the proposed Project.

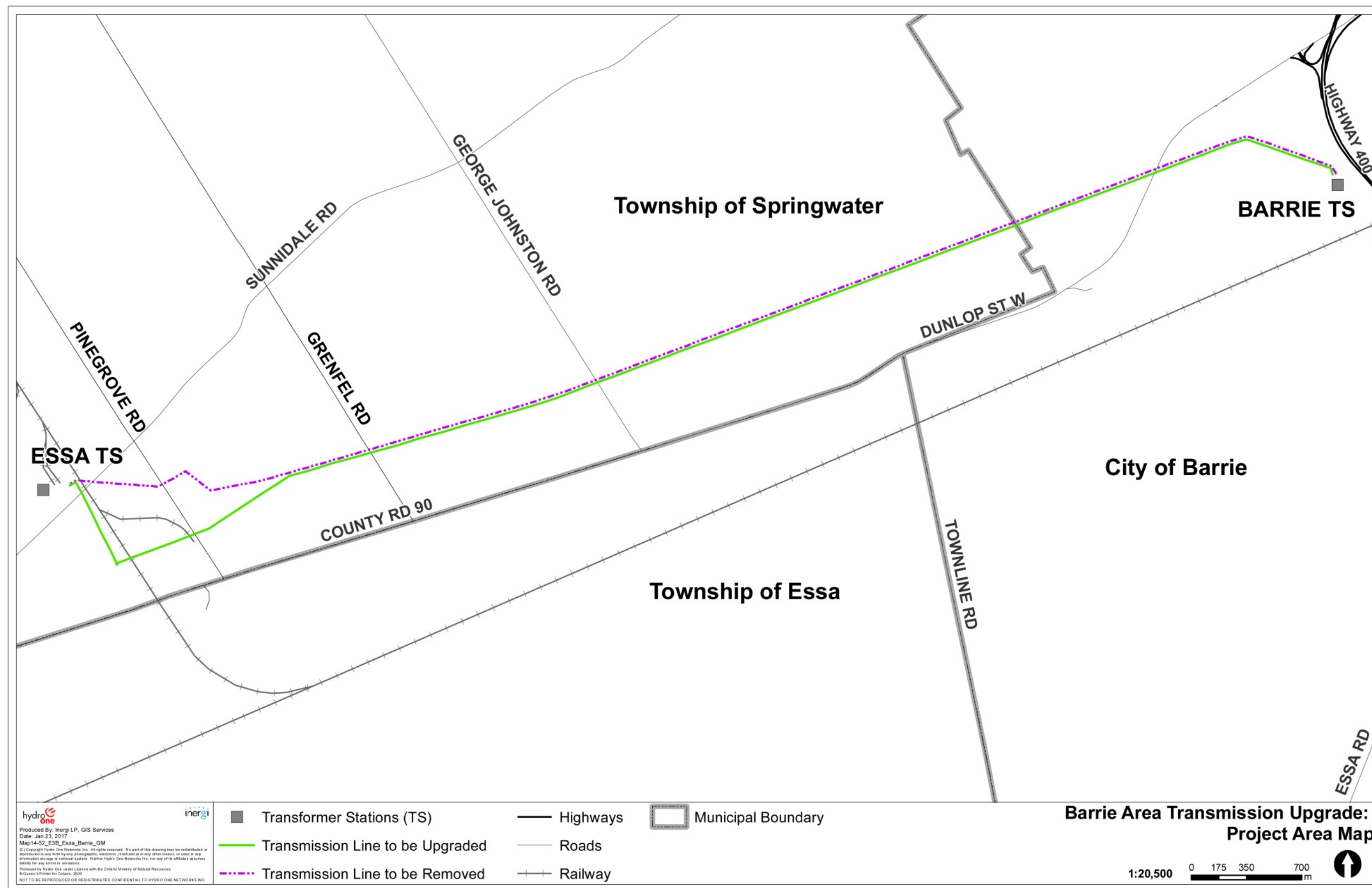


Figure 1-1: Project Area Map

1.1 Need for the Undertaking

The existing transmission lines and certain equipment at Essa TS and Barrie TS are approaching their end of life and are in need of replacement. In addition, upgrades to this infrastructure are needed to meet the region’s growing electricity demand. The need for the proposed Project was identified through the Barrie/Innisfil Integrated Regional Resource Planning process and presented in the Barrie/Innisfil Sub-region Integrated Regional Plan (IRRP) prepared by the IESO. The IRRP addresses the electricity needs for the area over the next 20 years from 2015 to 2034; specifically identifying immediate investments that are required to meet near- and medium-term needs in the sub-region (IESO, 2016). The Barrie/Innisfil Sub-region is within the South Georgian Bay/Muskoka planning region and encompasses the City of Barrie, the Towns of Bradford West Gwillimbury, Innisfil, and New Tecumseth and the Townships of Adjala-Tosorontio, Clearview, Essa, Mulmur, and Springwater. The approximate geographical boundaries of the sub-region are shown in Figure 1-2.

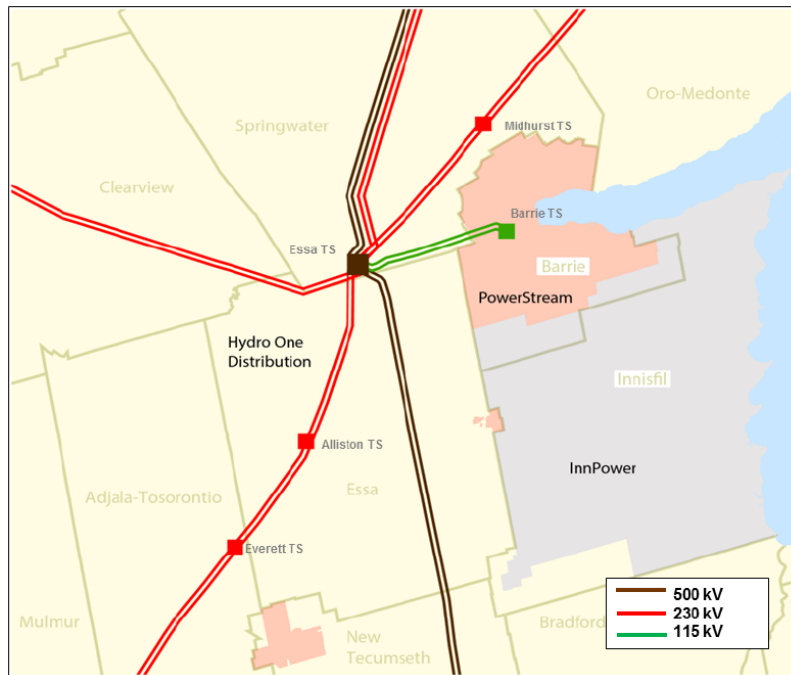


Figure 1-2: Barrie/Innisfil Sub-region Planning Area (IESO, 2016)

Barrie TS was placed in-service in 1962 and equipment is reaching its end of life and is in need of replacement. Barrie TS is supplied by the autotransformers at Essa TS via the 115 kV circuits E3B and E4B. This infrastructure was built in the 1950s and, with much of it reaching its end of life as well, is in need of replacement.

In December 2015, the IRRP Working Group, which consisted of staff from the IESO, Hydro One, Alectra (formerly PowerSteam) and InnPower, recommended the immediate development of this transmission project in the near-term due to the nature and timing of the need for this work. The following near-term requirements were identified:

- Barrie TS and the infrastructure that supplies it (circuits E4B and E3B) and equipment at Essa TS are reaching their end of life and require replacement; and
- The Barrie/Innisfil area is primarily supplied from the transmission system that is reaching its capacity to supply incremental growth; therefore, additional capacity is required to meet the region's growing electricity demand.

The proposed Project will strengthen and modernize the electricity grid in the area by meeting the replacement needs of end-of-life transmission infrastructure and the forecasted growth in the region, as identified in the IRRP document.

1.2 Description of the Undertaking

The proposed Project will involve removing the two existing single-circuit 115 kV transmission lines between Essa TS and Barrie TS, spanning a distance of approximately 9 kilometres (km), and constructing one double-circuit 230 kV transmission line within the existing right-of-way. One 115 kV transmission line, circuit E4B, will remain energized during the construction of the proposed Project to maintain an electricity supply to Barrie TS. After the 230 kV transmission line is constructed and energized, this 115 kV transmission line will be decommissioned. The new double-circuit 230 kV transmission line will consist of steel structures which will be taller in height compared to the existing infrastructure.

Barrie TS will be upgraded from a 115 kV to a 230 kV station, and end-of-life equipment will be replaced. The upgrades at Barrie TS will require an expansion of the station footprint

within the existing property boundary. Equipment at Essa TS which is nearing its end of life will be replaced and/or removed within the existing station fence line.

A detailed description of the proposed Project is provided in section 6 of this document. Detailed design of the proposed Project will take place following submission of this ESR, as discussed in section 6.1. Upon the successful completion of the approval process, construction could begin in spring 2019 and be completed by winter 2020.

1.3 Alternatives to the Undertaking

The EA Act and the Class EA process require identification and evaluation of alternatives to the undertaking. Alternatives to the undertaking are functionally different approaches to address the need for the undertaking. These alternatives must be reasonable from a technical, economic and environmental perspective.

During the development of the Barrie/Innisfil Sub-region IRRP, the Working Group assessed the following alternatives to the undertaking:

- Alternative 1: Do Nothing;
- Alternative 2: Conservation;
- Alternative 3: Local Generation; and
- Alternative 4: Transmission.

Alternative 1: Do Nothing

The “Do Nothing” alternative would not meet the need for the undertaking and is therefore not a feasible alternative to be carried forward for further consideration in this ESR.

Alternative 2: Conservation

Conservation plays a key role in maximizing the use of existing assets and maintaining reliable supply by offsetting a portion of a region’s growth, and was an alternative considered in the IRRP (IESO, 2016). This alternative was ruled out by the IRRP Working Group on the basis that the existing customer load that is currently supplied by Barrie TS would be left without electricity supply if the infrastructure is not replaced when it reaches its end of life. This alternative will therefore not be carried forward for further consideration in this ESR.

Alternative 3: Local Generation

The Local Generation option that was considered by the IRRP Working Group involves large transmission-connected generation and small-scale distribution-connected Distributed Generation options. This option was ruled out as a viable alternative to meet the need due to the end-of-life issues at Barrie TS. The existing customer load that is currently supplied by Barrie TS would be left without an electricity supply if the infrastructure is not replaced when it reaches its end of life. This alternative will therefore not be carried forward for further consideration in this ESR.

Alternative 4: Transmission

The fourth alternative considered new or upgraded transmission or distribution system assets, including lines, stations or related equipment. The transmission alternative was determined to be the only feasible alternative that would meet the replacement needs of end-of-life transmission infrastructure and the forecasted electricity demand in the region. This alternative has been carried forward for consideration in this ESR.

1.4 Approval Process and Regulatory Requirements

This section outlines the approval process as required under the Class EA process as well as other regulatory requirements.

1.4.1 Class Environmental Assessment Process

This ESR has been prepared in accordance with the Class EA (Hydro One, 2016), which was approved under the EA Act. The Class EA defines an environmental planning process which meets the requirements of the EA Act, including:

- Establish need (section 1.1);
- Identify and evaluate alternatives to the undertaking (section 1.3);
- Define study area (section 2);
- Issue initial notification (section 3.1);
- Conduct environmental inventory (section 4);
- Identify and evaluate alternative methods (section 5);
- Select preferred alternative method (section 5) and prepare draft ESR;

- Issue final notification and commence associated draft ESR review period (section 3.7);
- File Statement of Completion with the Ministry of the Environment and Climate Change (MOECC) and proceed with the undertaking (section 3); and
- Conduct consultation throughout the process (section 3).

The Class EA process is illustrated on Figure 1-3.

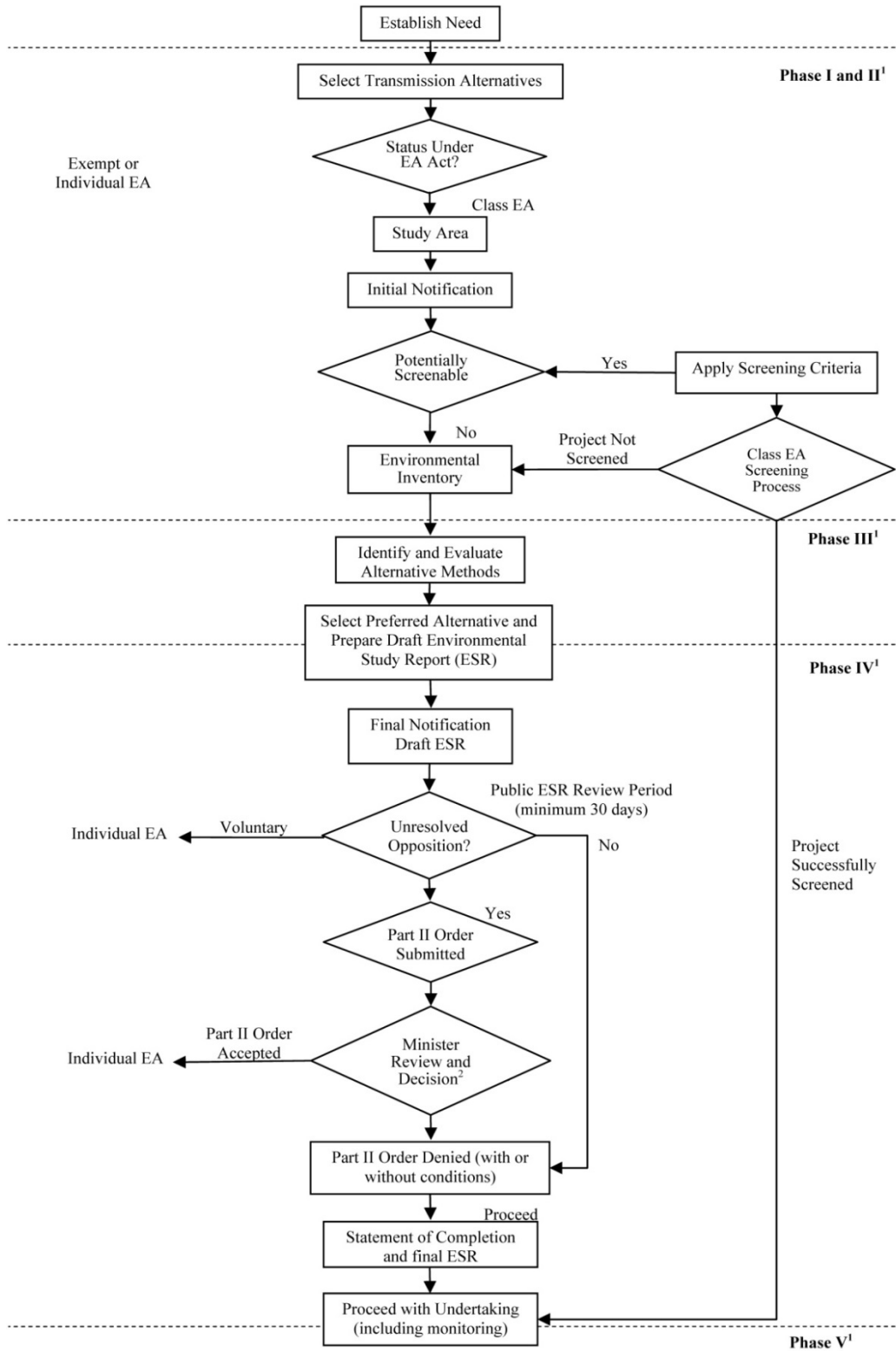
The Class EA process is equivalent to the Environmental Screening Process described in sections A.5.1 and A.5.2 of the Guide to Environmental Assessment Requirements for Electricity Projects (MOECC, 2011). The Class EA applies to Category B transmission projects that are not associated with Category B generation projects.

Transmission facilities covered under the Class EA include:

- a. The planning, design and construction of minor transmission lines and/or transformer stations (including telecommunication stations), and the subsequent operation, maintenance and retirement of these facilities.

Minor transmission lines include all transmission line projects involving greater than 2 km of line, which:

- i. Are capable of operating at a nominal voltage equal to 115 kV.
 - ii. Are capable of operating at a nominal voltage level higher than 115 kV and less than 500 kV, and which involve less than 50 km of line.
- b. The planning, design and construction required to modify or upgrade a transmission line, and the subsequent operation, maintenance and retirement of the revised line where:
 - i. The work requires replacement of poles or towers and/or changes in the right-of-way for existing transmission lines capable of operating at a nominal voltage of 115 kV or higher and no more than 500 kV.



¹ Phases of Generic Project Planning Process as described in the MOECC Code of Practice, s. 6.1.7 (MOECC, 2014)
² Refers to the Minister of the Environment

Figure 1-3: Class Environmental Assessment Process

- ii. The modified or upgraded existing lines would operate at a nominal voltage of equal to or greater than 115 kV, and equal or less than 500 kV (nominal voltage).

- c. The planning, design and construction required to modify or expand a transformer station, and the subsequent operation, maintenance and retirement of the modified station where:
 - i. Acquisition of additional property is required; and,

 - ii. The modified stations are capable of operating at a nominal voltage level of equal to or greater than 115 kV and equal to or less than 500 kV (where a station has more than one voltage level, the highest level is used in defining the station's nominal operating voltage).

Should there be substantive issues or potential effects raised by a concerned party regarding the proposed Project that cannot be resolved by the proponent, the Class EA process allows that concerned parties may request that the level of assessment for the project be elevated to an Individual EA (referred to as a Part II Order request). See section 3.7 for information on Part II Order requests.

Upon completion of the draft ESR, Hydro One issued a final notification to interested parties including First Nation communities, municipal and provincial government officials and agencies, potentially affected and interested persons and interest groups. The draft ESR was made available for public review and comment for a period of 30 calendar days, from January 29 to February 27, 2018. Hydro One responded to and made best efforts to resolve issues raised by concerned parties during the review period. These issues are documented and the resolutions summarized in this ESR.

Once the review period of the draft ESR was complete, all comments raised during the review period were incorporated into this report. A copy of this ESR is available on the Hydro One website, and a copy was sent to the Environmental Approvals Branch (EAB) and the appropriate Regional EA Coordinator at the MOECC for filing. The Statement of

Completion was submitted to the MOECC along with this ESR on March 16, 2018. This project is now considered acceptable and can proceed as outlined in this ESR.

1.4.2 Ontario Energy Board Act, 1998

The proposed Project requires approval from the Ontario Energy Board (OEB). The OEB is responsible for regulating natural gas and electricity utilities. In order to obtain approval for the construction, expansion or reinforcement of electricity lines or interconnections, where the transmission line is longer than 2 km in length, proponents must submit an application to the OEB for “Leave to Construct” approval under section 92 of the *Ontario Energy Board Act, 1998* (OEB Act). Hydro One will file an application to the OEB seeking “Leave to Construct” for the line construction component of the proposed Project in accordance with section 92 of the OEB Act. The OEB review process for Hydro One’s “Leave to Construct” application also includes opportunities for involvement of First Nation and Métis communities, members of the public, and stakeholders.

1.4.3 Other Permits, Licenses and Approvals

In addition to meeting EA Act requirements, there are a number of necessary permits, licenses and approvals that may be required under federal, provincial and municipal legislation (see Table 1-1). Hydro One will contact the appropriate regulatory agencies to ensure that the proposed Project meets applicable requirements and that approvals are obtained as necessary. This project does not trigger a federal environmental assessment under the *Canadian Environmental Assessment Act, 2012*.

Hydro One TS facilities discharge noise and processed stormwater to the surrounding environment. Hydro One is undertaking studies to ensure noise emissions will continue to be within provincial guidelines at surrounding receptors and the facility will be registered under Ontario’s Environmental and Sector Registry (EASR). Hydro One will also obtain Environmental Compliance Approvals (ECA) for operation of industrial sewage works (stormwater processing) at both Essa TS and Barrie TS. The facility will discharge clean water, meeting Ontario Provincial Water Quality Objectives, to the ground surface adjacent to the station. Neither noise emissions nor drainage discharge will be in quantities or

qualities expected to cause an adverse effect. The upgraded Essa TS and Barrie TS will operate in very much the same manner as the existing stations.

As stated in section 62(1) of the *Planning Act* (R.S.O. 1990, c. P.13), “An undertaking of Hydro One Inc. that has been approved under the EA Act is not subject to this *Act*.” While the proposed Project will not be subject to the *Planning Act* after completion of the Class EA, Hydro One has been consulting with the Township of Springwater and City of Barrie during the EA process and will continue to consult with the Town and City regarding the design, and the effects of the construction on local traffic and the community.

Table 1-1: Potentially Required Permits, Licenses and Approvals

PERMIT, LICENSE, OR APPROVAL	PRIMARY AGENCY	DESCRIPTION
OEB Leave to Construct Approval	OEB	Required for the upgrade of the existing transmission line.
Transport Canada Aeronautical Assessment	Transport Canada	Required for the construction of the new transmission structures.
Nav Canada Land Use Assessment	Nav Canada	Required for the construction of the new transmission structures.
Air and Noise EASR Registration	MOECC	Required for the changes to the noise emitting equipment (i.e., transformers) at Essa TS and Barrie TS.
Drainage ECA	MOECC	Required for the modification to the site drainage at Essa TS and Barrie TS.
EASR or Permit to Take Water (PTTW)	MOECC	May be required for construction dewatering.
Approvals and/or Permits under the <i>Endangered Species Act, 2007</i>	Ministry of Natural Resources and Forestry (MNRF)	Approval may be required for planned works that might affect species at risk protected under the <i>Endangered Species Act, 2007</i> .
Archaeological Acceptance Letters	Ministry of Tourism, Culture and Sport (MTCS)	Acceptance is required prior to undertaking new ground disturbance in areas with archaeological potential.
Encroachment Permit	Ministry of Transportation (MTO)	Required when working adjacent to Highway 400.
Building Permits	Town of Springwater; City of Barrie	Required for the construction or demolition of buildings over 10 square metres (m ²).
Noise By-law Exemption	Township of Springwater; City of Barrie	An exemption may be required if the operation of construction equipment occurs outside of the noise by-law curfew.
Road Entrance Permit	Township of Springwater; City of Barrie	Required to construct an entrance for access to a construction site.

PERMIT, LICENSE, OR APPROVAL	PRIMARY AGENCY	DESCRIPTION
Tree Removal Permits	Township of Springwater; City of Barrie	Permit may be required for tree removal.
Clearance Letter	Utility and railway companies	Required to cross utilities (e.g., natural gas or oil pipelines) or railways
Laydown and Access Road Agreements(s)	Property owner	Required for access and occupation during construction.

2 Study Area Definition

A project study area is delineated to encompass the area of potential project effects. The proposed Project involves upgrading existing Hydro One infrastructure within an existing transmission right-of-way and within the Hydro One owned properties of Essa TS and Barrie TS. No expansion of the existing transmission right-of-way width or additional property for the upgrades at Essa TS or Barrie TS will be required for the proposed Project. The existing right-of-way traverses sensitive features (i.e., wetlands) with the potential to be affected by the proposed Project. The existing right-of-way is 50 m wide, where the two transmission lines currently parallel each other, and 30 m wide each east of Essa TS where they are separate. In order to identify any potential effects to these features, the study area for the proposed Project was delineated to areas within 100 metres (m) from the centreline of the existing right-of-ways and from the property boundaries of the Hydro One owned station properties, encompassing a larger area than the expected work area. The study area extends from Essa TS in the Township of Springwater, east along the existing transmission right-of-way (circuits E3B and E4B) to Barrie TS, in the City of Barrie (see Figure 2-1).

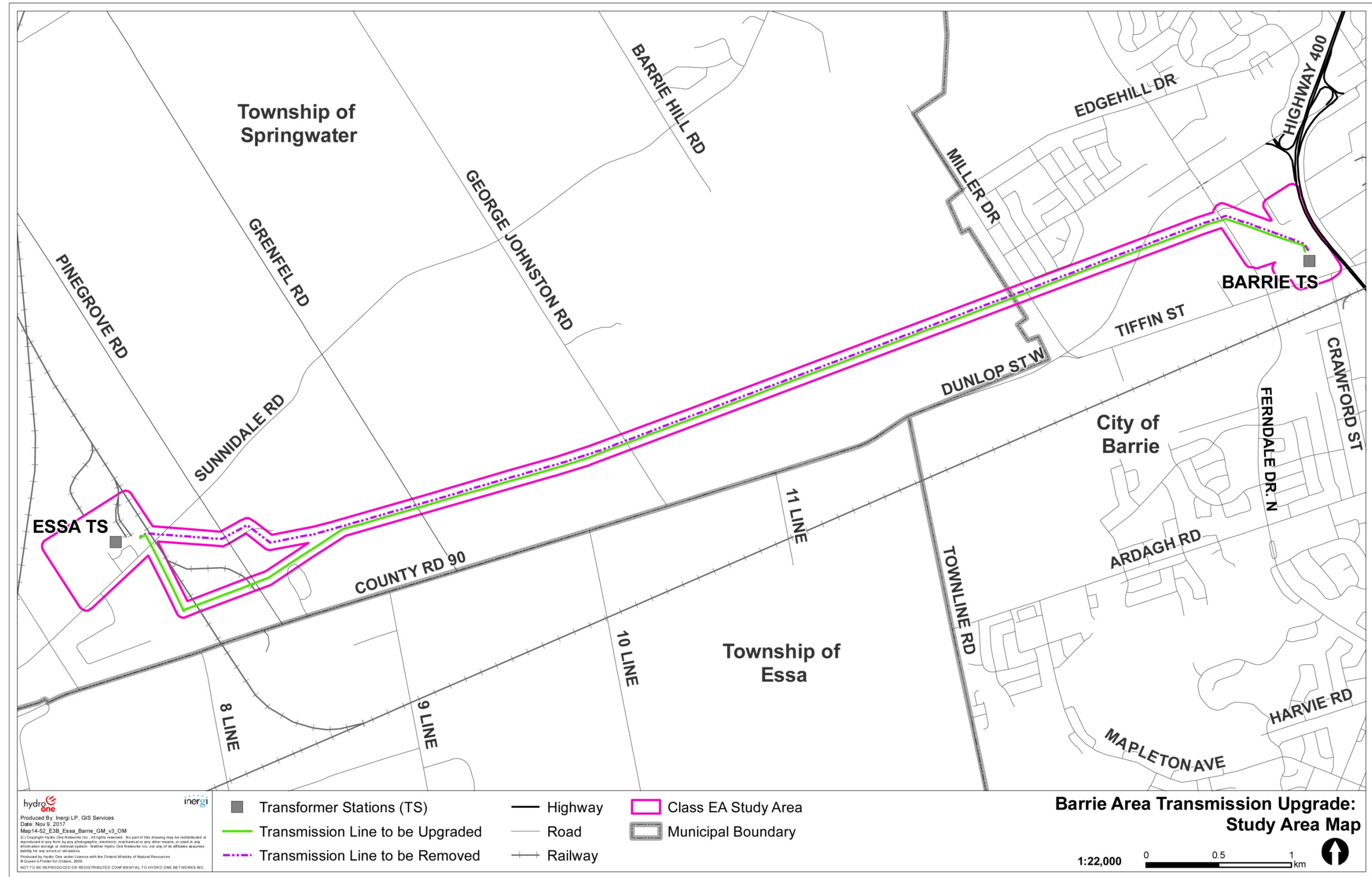


Figure 2-1: Study Area

3 Consultation

Consultation is an important component of the EA process as it provides those who may be interested in, or potentially affected by, the proposed Project with timely and adequate information and opportunities to participate in the planning process. Consultation also allows the proponent to gain information and knowledge related to social, cultural, economic and environmental considerations of direct relevance to the proposed Project as well as provides an opportunity to for the project team to engage directly with interested stakeholders.

The key principles that guide Hydro One's approach to communication and consultation include the following:

- Early, ongoing and timely communications and consultation;
- Clear project information;
- An open, transparent, and flexible consultation process;
- Respectful dialogue with First Nation and Métis communities, community officials, and project stakeholders;
- No surprises approach for elected officials, to ensure they have copies of all public-facing materials before they are distributed to their constituents;
- The provision of ongoing opportunities for interested parties to learn about and provide meaningful input on the proposed undertaking; and
- Full and fair considerations and documentation by the proponent of all input received during the consultation process and incorporation of such input, where feasible, into project decision-making.

The consultation process incorporated methods to encourage two-way communication involving: First Nations communities identified by the Crown; provincial and municipal government officials and agencies; local residents and landowners; potentially affected and interested persons; and interest groups. The project contact list and notification area is provided in Appendix A1.

Consultation methods were selected to promote a comprehensive and transparent consultation approach. Consultation methods for this project included:

- Letters, flyers, and newspaper ads to announce and provide updates on the project;
- Public Information Centres (PICs), which provided opportunities for interested parties to discuss with and pose questions to the Hydro One project team and complete comment forms;
- Discussions with local elected officials;
- Establishment of a project contact list, through which interested parties can receive project updates via e-mail;
- Dedicated Community Relations representatives; and,
- Establishment and maintenance of a project website (www.HydroOne.com/Projects/BarrieAreaUpgrade), which allows for the sharing of project information.

The results of the consultation process are summarized in the sections below. Input was considered by the project team and incorporated into the proposed Project where appropriate. Copies of consultation materials, such as notices, notification letters, and PIC displays are included in Appendices A2 through A4.

3.1 Initial Notification

Notifications were sent to First Nations communities as identified by the Crown, government officials and agencies, potentially affected and interested persons, community associations, and the nearby residents.

The Notice of Commencement presented details about the proposed Project, information regarding the need for the proposed Project, and outlined opportunities to provide input and comments to Hydro One. Each ministry, department and agency was asked to provide comments with respect to potential concerns relating to their respective policies, mandates and/or jurisdictions.

Hydro One issued a Notice of Commencement letter including a map of the proposed Project area to four First Nations communities as identified by the Crown – Huron-Wendat,

Beausoleil First Nation, Chippewas of Georgina Island, and Chippewas of Rama First Nation – in October 2016. A copy of the Notice of Commencement sent to First Nations communities can be found in Appendix A2.

The Notice of Commencement was issued to municipal and provincial government officials and agencies, potentially affected and interested persons, and interest groups in January 2017. A copy of the Notice of Commencement sent to the above stakeholders can be found in Appendix A2.

The Notice of Commencement was distributed via e-mail, Canada Post letter mail, and newspaper advertisements. Advertisements were published in the *Barrie Advance* and *Barrie Examiner* on January 19 and 26, 2017 and in the *Springwater News* on January 26, 2017. A copy of the newspaper advertisement can be found in Appendix A2.

Notifications were sent via Canada Post letter mail to addresses within the project notification area, which included the study area and adjacent residential communities located within 100 m of the project right-of-way centreline along the existing transmission line, and within 100 m of the Essa TS and Barrie TS property boundaries (a map of the Notification Area is provided in Appendix A1). The notification area also encompassed all addresses located on Tiffin Street, from Highway 400 to Ferndale Drive, consisting mainly of commercial properties as well as the residential area adjacent to the right-of-way near Pringle Drive, to all addresses south of Sproule Drive. Additionally, notifications were sent to the residential area located near Essa TS, to all addresses on Parr Boulevard.

3.2 First Nation and Métis Communities

The consultation requirements of the Class EA process apply to First Nation and Métis communities. In adherence to the Crown's duty to consult and accommodate under section 35 of the *Constitution Act* (1982), Hydro One contacted the Ministry of Energy early in the project planning process on May 24, 2016, and provided a description of the characteristics and location of the proposed Project. On September 9, 2016, the Ministry of Energy, on behalf of the Crown, confirmed the duty to consult and advised that the Huron-Wendat, Beausoleil First Nation, Chippewas of Georgina Island, and Chippewas of Rama First Nation communities be included in the project consultation process.

The Huron-Wendat, Beausoleil First Nation, Chippewas of Georgina Island, and Chippewas of Rama First Nation communities were notified about the proposed Project and, throughout the consultation process, informed of project updates and given opportunities to provide input. This was achieved by way of mailing and e-mailing of notifications, provision of information and updates about the proposed Project, and offers by the Hydro One project team to meet with the First Nation community to listen to any issues and concerns.

3.2.1 Huron-Wendat

Hydro One initiated consultation by sending a project notification letter via registered mail and e-mail to the Huron-Wendat on October 6, 2016. This preliminary engagement activity took place early in the project planning process in order to ensure that the Huron-Wendat could provide input at an important stage in project planning. A response to the initial notification letter was received via e-mail on October 13, 2016, with an inquiry into whether any archaeological assessments had been conducted. Hydro One responded on October 18, 2016, indicating that a Stage 1 archaeological assessment had already been completed with a Stage 2 archaeological assessment to take place in late 2017.

In an e-mail on January 13, 2017, Hydro One provided the Notice of Commencement newspaper advertisement, information regarding the PICs and an offer to hold a PIC in their community. In this e-mail Hydro One also included, at the request of the Huron-Wendat, a copy of the Stage 1 archaeological assessment report. The Huron-Wendat requested to have a Field Liaison Representative (FLR) from the community participate in the Stage 2 archaeological assessment. Hydro One welcomed the request and coordinated the participation of an FLR with the archaeological consultant, AECOM, who conducted the assessment from June 1, to October 12, 2017. In accordance with the draft technical bulletin entitled *Engaging Aboriginal Communities in Archaeology* (MTCS, 2011b), the FLRs from the Huron-Wendat were present to observe and participate in the Stage 2 archaeological assessment in order to inform the Huron-Wendat of the survey results (see section 4.3 for results of the assessment). There were no further comments received.

3.2.2 *Beausoleil First Nation*

Hydro One initiated consultation by sending a project notification letter via registered mail and e-mail to the Beausoleil First Nation on October 6, 2016. This engagement activity took place early in the project planning process in order to ensure that the Beausoleil First Nation could provide input at an important stage in project planning.

A project update e-mail was sent on January 13, 2017, which included the Notice of Commencement newspaper advertisement, information regarding the first set of PICs and an offer to hold a PIC in their community. Hydro One followed up via telephone on January 20, 2017. The Beausoleil First Nation responded in a letter dated January 24, 2017, that there were no significant concerns with regard to the proposed Project. They requested a copy of the ESR for review, and for Hydro One to advise the community immediately should there be any archaeological issues. There were no further comments received.

3.2.3 *Chippewas of Georgina Island*

Hydro One initiated consultation by sending a project notification letter via registered mail and e-mail to the Chippewas of Georgina Island on October 6, 2016. This engagement activity took place early in the project planning process in order to ensure that the Chippewas of Georgina Island could provide input at an important stage in project planning. The First Nation responded to the initial consultation via e-mail on October 18, 2016, indicating that they had no comments at the time, and requested to continue receiving any project information in the future. Should any other First Nation have objections with the proposed Project, the Chippewas of Georgina Island requested to be notified as well.

A project update e-mail was sent on January 13, 2017, which included the Notice of Commencement newspaper advertisement, information regarding the first set of PICs and an offer to hold a PIC in their community. There were no further comments received.

3.2.4 *Chippewas of Rama First Nation*

Hydro One initiated consultation by sending a project notification letter via registered mail and e-mail to the Chippewas of Rama First Nation on October 6, 2016. This preliminary engagement activity took place early in the project planning process in order to ensure that the Chippewas of Rama First Nation could provide input at an important stage in project

planning. On October 12, 2016, the Chippewas of Rama First Nation responded via e-mail indicating that they had received the notice and it had been shared with the Williams Treaties First Nation Process Co-ordinator/Negotiator, Karry Sandy McKenzie, and indicated that Ms. McKenzie will be reviewing the notice.

The Notice of Commencement newspaper advertisement and invitation to the PIC was sent to Ms. McKenzie as well as the Chippewas of Rama First Nation on January 13, 2017. Hydro One followed-up with the Chippewas of Rama First Nation and Ms. McKenzie to offer to hold a PIC or meeting in the community. On April 7, 2017, Hydro One received an e-mail from Ms. McKenzie stating that the Chippewas of Rama First Nation did not have any concerns at that time and did not require a community meeting on this project. On April 26, 2017, the Chippewas of Rama First Nation expressed interest in procurement opportunities for the construction of the proposed Project. Hydro One will continue to update the community throughout the planning of the proposed Project on any opportunities for procurement of their services. There were no further comments received.

3.3 Provincial Government and Agencies

As part of the consultation plan for the project, the following provincial government representatives and agencies were contacted:

- Local Member of Provincial Parliament (MPP) – Simcoe-Gray;
- Local Member of Provincial Parliament (MPP) – Barrie;
- Ministry of Energy;
- Infrastructure Ontario;
- Ministry of the Environment and Climate Change -
 - Environmental Assessment and Approvals Branch,
 - Air, Pesticides and Environmental Planning – Central Region, and
 - Barrie District Office;
- Ministry of Natural Resources and Forestry – Midhurst District Office;
- Ministry of Tourism, Culture and Sport – Heritage Program Unit; and
- Ministry of Transportation – Central East Region.

Hydro One initiated pre-consultation by sending a project notification letter to the MPPs for the project area on October 18, 2016. This preliminary engagement activity was hosted early in the project planning process in order to ensure that the provincial government could provide input at an important stage in project planning.

Hydro One initiated formal consultation with government agencies by sending a project notification letter on January 13, 2017. The project notification included the Notice of Commencement and invitation to attend the PICs.

The following provincial government and agencies did not respond to Hydro One's initial notification: MPP – Simcoe-Gray; MPP – Barrie; Infrastructure Ontario; MOECC; MTCS; and MTO. Additional details on correspondence with the following provincial agencies can be seen in the sections below:

- Ministry of Energy; and
- Ministry of Natural Resources and Forestry – Midhurst District Office.

A summary of the issues and concerns raised by the provincial government and various agencies throughout the consultation process is provided in section 3.6. A summary of the comments received from provincial government and agencies during the draft ESR review period is provided in section 3.7.

3.3.1 Ministry of Energy

On September 9, 2016, the Ministry of Energy confirmed the list of First Nation communities in proximity to the proposed Project area. The Ministry of Energy recommended that Hydro One notify these First Nation communities, provide project information and opportunities for input, and maintain a record of interactions with the communities. The Ministry of Energy requested that they be kept updated on the consultations. No further comments have been received from the Ministry of Energy to date.

3.3.2 Ministry of Natural Resources and Forestry – Midhurst District

The MNRF was notified by e-mail on January 13, 2017. The MNRF replied to the Notice of Commencement and on January 27, 2017, indicating that the general area of the proposed Project has a high number of natural heritage features, which include: Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), significant wildlife habitat, and habitat of rare and at risk species. The MNRF requested that Hydro One conduct a natural heritage evaluation study, and that the Ministry should be included in the circulation of the study and related documents.

A meeting was held with the MNRF, Midhurst District, on February 27, 2017. The purpose of the meeting was to introduce the project, explain the need for the project, discuss the project plan for natural environment surveys, provide details on construction methods, and gather input, information and feedback from the MNRF. Following this meeting on March 22, 2017, the MNRF provided additional information regarding the PSW within the proposed Project study area and confirmed a list of species at risk (SAR) with potential to encounter within the study area. This information was used to develop the natural environment surveys, further discussed in section 4. Comments on the draft ESR were provided by the MNRF on February 27, 2018 (see section 3.7).

3.4 Municipal Government and Local Agencies

As part of the consultation process for the proposed Project, the following municipal government representatives and departments were contacted:

- Township of Springwater, Mayor and Council (including local Councillors, CAO, and Municipal Clerk);
- Township of Springwater, Planning Department - Director of Recreation/Parks/Properties, and Director of Planning Services and By-law Enforcement;
- City of Barrie, Mayor and Council (including local Councillors, Chief Administrative Officer [CAO], and City Clerk);
- City of Barrie, Department of Planning and Building Services -
 - Director of Planning & Building Services,

- Growth Management Coordinator,
- Senior Policy Planner,
- Supervisor, Roads, Parks & Fleet;
- Township of Essa, Planning and Development Department - Manager of Planning and Development;
- Town of Innisfil, Planning Services Department - Development Project Manager;
- Simcoe County (Warden, CAO and County Clerk);
- Lake Simcoe Region Conservation Authority (LSRCA); and
- Nottawasaga Valley Conservation Authority (NVCA).

Hydro One initiated formal consultation with municipal government representatives via a Notice of Commencement, which was sent on January 13, 2017. These representatives were also sent the Notice of Commencement and invitation to the PICs via e-mail. No comments have been received from the Township of Essa, Town of Innisfil or Simcoe County to date. A summary of the comments received from municipal government and agencies during the draft ESR review period is provided in section 3.7.

3.4.1 Township of Springwater

Pre-consultation with municipal elected officials of the Township of Springwater took place early in the planning process, with an introductory project letter providing information regarding the proposed Project on October 17, 2016, follow-up telephone calls and offers for in-person meetings. Hydro One initiated formal consultation with Township of Springwater municipal elected officials via a Notice of Commencement issued on January 10, 2017. A meeting was held prior to the PIC on February 1, 2017, with a Councillor and the Acting CAO of the Township of Springwater. A project update was sent via e-mail to the Township of Springwater Director of Planning Services and By-law Enforcement on November 17, 2017. No concerns with the proposed Project have been identified by the Township of Springwater to date.

3.4.2 *City of Barrie*

Pre-consultation with municipal elected officials of the City of Barrie took place early in the planning process, with an introductory project letter providing information regarding the proposed Project on October 17, 2016, follow-up telephone calls and offers for in-person meetings. Hydro One initiated formal consultation with City of Barrie municipal elected officials via a Notice of Commencement issued on January 10, 2017. On February 13, 2017, the City of Barrie, Engineering Department, responded to Hydro One's Notice of Commencement indicating that the City has a comprehensive road widening plan and they would like to confirm that the proposed Project could be coordinated with the City's road works. On February 17, 2017, Hydro One met with the City of Barrie, Engineering Department. The City identified permit requirements for any damage or modification to City roads for access during construction and construction timelines for Hydro One and the City's projects. The City indicated that the construction of a new condominium development is planned at 40 Miller Drive by Innovate Planning Solutions/Hedbern Homes. Hydro One committed to getting into contact with the developer. No concerns with the proposed Project were identified. Hydro One sent a project update via e-mail to the Director of Planning & Building Services on November 6, 2017 and a meeting was held with representatives from the Planning & Building Services and Engineering departments on March 8, 2018. No concerns with the proposed Project have been identified by the City of Barrie to date.

3.4.3 *Lake Simcoe Region Conservation Authority*

Hydro One sent a request for information, along with the Notice of Commencement, to the LSRCA in January 2017 asking for any known sensitive features in close proximity to the study area. The LSRCA provided a response to the notification on February 17, 2017, and indicated that the transmission line crosses some wetland, woodland, Dyments Creek, and that it is part of a floodplain. It also identified a portion of Highly Vulnerable Aquifer (HVA) and/or a WHPA within the study area. The letter confirmed that permits from the Conservation Authority would not be required for Hydro One. The LSRCA recommended that as part of the Class EA process a mitigation hierarchy is applied which would include avoidance, minimization and mitigation for any identified impacts to natural heritage features

within the study area. The LSRCA also recommended that if there are unavoidable impacts, an approach of ecological offsetting be used to replace any loss of natural heritage features with an objective of 'net gain' for ecological value. Their letter also advised that any work within the regulated floodplain should ensure no net loss of flood storage capacity, conveyance, or increase in hazard on adjacent properties. A project update was provided to the LSRCA on August 30, 2017 which included an offer to meet to discuss the project further and commitment to provide the LSRCA with details on how to access the draft ESR when it is available for review. Comments on the draft ESR were provided by the LSRCA on February 27, 2018 (see section 3.7).

3.4.4 Nottawasaga Valley Conservation Authority

Hydro One sent a request for information, along with the Notice of Commencement, to the NVCA in January 2017 asking about any known sensitive features in close proximity to the study area. A meeting was held with the NVCA on February 27, 2017. The purpose of the meeting was to introduce the project and discuss the need for the project, as well as to discuss natural environment survey plans, provide details on construction methods, and gather any information and feedback from the NVCA pertaining to the project. The NVCA confirmed that permits from the Conservation Authority would not be required for Hydro One. Hydro One committed to keeping the NVCA apprised of project developments and of timing for the ESR review period. On February 28, 2017, NVCA provided Hydro One with additional information to assist in the development of their natural heritage studies. A project update was provided to the NVCA on August 30, 2017 which included a commitment to provide the NVCA with details on how to access the draft ESR when it is available for review as well as details of the natural environment surveys and results of those surveys. No further comments have been received from the NVCA to date.

3.5 Potentially Affected and Interested Persons, Businesses and Interest Groups

Consultation opportunities were provided to potentially affected and interested persons, businesses and interest groups throughout the Class EA process. Notification about the proposed Project was achieved by means of hand delivered notices to residential and

commercial units and buildings, Canada Post letter mail, e-mail and newspaper advertisements.

In addition, Hydro One encouraged interested persons to sign up for the project e-mail list to be notified with project updates.

A table summarizing the key issues and concerns raised by potentially affected and interested persons, businesses, and interest groups throughout the consultation process is presented in section 3.6. The table includes a summary of efforts to address concerns and mitigate potential effects, as well as commitments made. A summary of the comments received from interested persons during the draft ESR review period is provided in section 3.7.

3.5.1 Utilities

The following utilities were included in the contact list because of their existing infrastructure within or near the study area:

- Alectra Utilities (formerly PowerStream); and
- InnPower.

These organizations were notified by e-mail using known contact information or publically available contact details. These organizations were circulated the Notice of Commencement and invitations to the PICs in January 2017. No comments have been received from Alectra Utilities or InnPower to date.

3.5.2 Potentially Affected and Interested Persons

Residential, commercial, and industrial property owners, and local residents who may be potentially affected by the proposed Project were contacted, as described in section 3.1.

Hydro One held PICs in two locations - one in the City of Barrie on January 31, 2017, and one in the Township of Springwater on February 1, 2017 (see section 3.5.4). Hydro One has corresponded with a number of potentially affected and interested parties via e-mail/letter on an ongoing basis throughout the project. Further details are provided in section 3.6 and in Appendix A3.

On February 17, 2017, representatives from Hedbern Homes and Innovate Planning Solutions were contacted by phone and e-mail to provide them with information about the project.

3.5.3 Community Associations

As part of the consultation plan for the proposed Project, the following local community associations were contacted as described in section 3.1:

- Association of Major Power Consumers of Ontario;
- Barrie Gun Club;
- Barrie Snowmobile Club;
- Barrie Taxpayers Association;
- Bear Creek Eco Rangers;
- Downtown Barrie Business Improvement Area;
- Greater Barrie Chamber of Commerce;
- Midhurst Ratepayers Association;
- Simcoe County Federation of Agriculture; and
- Sno Voyageurs.

No comments have been received from community associations to date.

3.5.4 Public Information Centre

On January 31, and February 1, 2017, Hydro One hosted two PICs for the proposed Project. The first PIC was held on January 31, 2017. The event was held from 5:00 p.m. to 8:00 p.m. at the Lampman Lane Community Centre at 59 Lampman Lane in the City of Barrie. The Lampman Lane Community Centre is located approximately 2 km northwest of the project study area. The second PIC was held on February 1, 2017, from 5:00 p.m. to 8:00 p.m. at the Grenfel Community Centre at 1989 Sunnidale Road in the Township of Springwater. The Grenfel Community Centre is located approximately 660 m northwest of the project study area.

The purpose of the PICs was to provide information on the proposed Project, the Class EA process, construction methods and techniques that may be used for the proposed Project, next steps in the planning and approvals process, and to solicit input from the public. A set of 21 display panels were set up to allow attendees to obtain information about the proposed Project and to allow for one-on-one discussions and question-and-answer with the Hydro One project team. The PIC panels are provided in Appendix A4 and included information about the following:

- Current transmission infrastructure and the proposed Project;
- Information on the proposed Project location;
- Overview of the need for the proposed Project;
- Overview of the Class EA process;
- Natural features and biodiversity initiative;
- Introduction to what can be expected during construction for the proposed Project, and the activities and mitigation measures that can be expected by local residents and businesses during construction; and
- Project timelines.

Eight individuals attended the PIC in the City of Barrie and four individuals registered at the PIC in the Township of Springwater. Participants at the PICs consisted of local residents, business representatives and municipal staff.

Project team representatives including the Hydro One project manager, community relations representatives, representatives from the IESO, and subject matter experts were on hand to answer questions, have discussions with participants, and to listen to participants' input. Comment forms were also available to provide attendees with the opportunity to record comments and/or concerns and to provide feedback. A copy of the comment form is provided in Appendix A4. In total, two completed comment forms were submitted between the two PICs, and they were received following the PIC in the City of Barrie. The information provided in the feedback indicated that the PIC was helpful in understanding the proposed transmission refurbishment, and that there was an adequate opportunity to

express comments to Hydro One's project team. No further comments, questions, or concerns were indicated on the feedback forms.

Further details about the PICs can be found in Appendix A4. Section 3.6 provides a summary of the issues and concerns raised at the PICs and Hydro One's efforts to address concerns or mitigate potential effects.

3.6 Summary of Key Issues

Table 3-1 summarizes the key issues and concerns raised during the Class EA process before the review period of the draft ESR. A complete summary of questions and comments Hydro One received during the Class EA process is provided in section 3.2 to 3.5 and Appendix A3.

Table 3-1: Summary of Questions and Concerns Raised During the Class EA Process

THEME	ISSUE/CONCERN	RESPONSE FROM HYDRO ONE
Class EA Process		
Class EA Process	The Ministry of Energy recommended Hydro One notify the First Nation communities identified by the Ministry, provide project information and opportunities for input, and maintain a record of interactions with the communities about the proposed Project.	Hydro One is maintaining a record of engagement with all relevant First Nation and Métis communities in relation to the proposed Project.
	The Ministry of Energy requested to be kept informed of the consultations and if any mitigation or accommodation proposals are requested or otherwise considered.	Hydro One will keep the Ministry of Energy up to date on the consultation with First Nation communities.
Technical Design		
Tower Locations	Question regarding where the new transmission structures will be located.	<p>Hydro One takes into account a number of technical and environmental considerations when identifying structure placements. Some of the considerations include, existing structure locations and the area needed for their removal, new structure heights, span between structures, topography and soil conditions, road crossing clearances, traffic impacts, business and residential impacts, and environmental constraints.</p> <p>Locations of the new structures will be determined during the detailed design phase. Steel structures are being proposed to replace the existing wood pole H-frame structures along the centreline of the existing circuit E3B transmission line (southern line). Input received will be taken into consideration before finalizing the engineering design.</p>
Tower Design	Question regarding height of new steel structures.	Tower height is to be determined during the detailed design phase of the proposed Project and Hydro One would provide this information to interested persons or agencies once it is available. Approximate tower heights and details on the proposed structures are presented in section 6.1.

THEME	ISSUE/CONCERN	RESPONSE FROM HYDRO ONE
Natural Environment		
Impacts to Wildlife and Habitats	Potential effects within the wetland.	Mitigation measures are required to protect the wetland areas during project activities and are discussed in section 7. Hydro One has committed to undertaking a biodiversity initiative specific to this project to compensate for any potential residual net effects to natural communities or resources that may occur.
	Eliminate or minimize any potential impacts to turtles (and more specifically SAR turtles).	The presence of SAR in the study area was evaluated during the 2016 and 2017 field surveys. Turtle habitat was identified and surveyed, and incidental observations of turtles were recorded. Results of the surveys and potential effects to wildlife and SAR are discussed in sections 4 and 7.
Vegetation	Vegetation management along right-of-way.	Vegetation management is generally carried out by Hydro One Forestry along right-of-ways on multi-year cycles. This forestry work is required to remove incompatible vegetation along existing right-of-ways. There may be some vegetation removal required along the existing right-of-way to ensure access for construction equipment.
Socio-Economic Environment		
Visual Aesthetics	Height of new, taller, transmission structures.	The new 230 kV steel structures will be taller than the existing wood pole structures; however, exact heights would be determined during the detailed design phase of the proposed Project. Hydro One would provide this information to interested persons or agencies once it is confirmed. Visual and Aesthetic Resources and potential effects to these resources is discussed in sections 4 and 7.
Nuisance Effects	Concerns about power outages.	It is not anticipated that local businesses or residences would experience any power outages as part of the proposed Project.
Property Impacts	Decrease in property values.	Property value is dependent on many factors including the type of property, location/neighbourhood factors as well as broader social and economic conditions associated with the overall marketplace. We recognize that the construction activities involved in the proposed Project may be temporarily disruptive to people living in close proximity. While it is possible that an

THEME	ISSUE/CONCERN	RESPONSE FROM HYDRO ONE
		individual property's values may decline during the construction given the activities/disruption; however, it is expected that these values would return to market values consistent with other similar properties in the local marketplace shortly after construction.
Construction		
Construction Coordination	Coordination with a City of Barrie project focused on road widening in the vicinity of the planned transmission upgrades.	Hydro One to work with the City of Barrie to coordinate where possible, in order to accommodate road widening.
Construction Methods	Removal of existing wood poles and footings; and removal of gravel so land may be cultivated.	Although there are no footings on the wood poles, Hydro One would be excavating the base of the wood pole and cutting them below grade. If complete removal of the entire wood pole is required, Hydro One and its contractors will work with the property owner to achieve that. Hydro One can remove any gravel and stone located directly around the wood pole base.
	Process for selecting construction contractors.	Contractor bids would be evaluated on several factors including work schedule, past work experience, contract price, and safety record.
	Construction timelines and methods.	Once the Class EA has been completed, detailed engineering and construction planning would begin. Details would be made available at a pre-construction PIC. Information shared at the PIC would include, construction activities, timelines, equipment used, construction hours, construction route, what residents could expect and who to contact if they have any questions or concerns. Local residents would receive an invitation from Hydro One with the PIC details. Preliminary site-preparation activities for construction could start in spring 2019. The project is expected to be completed by end of year 2020. Work at any given location would be intermittent during the construction period.
	Dust during construction.	Dust suppression requirements would be stipulated to construction crews, including any Hydro One contractors.
Releases to the Environment	Concerns about noise during construction.	Hydro One and contractors would abide by the City of Barrie and Township of Springwater noise by-laws.

THEME	ISSUE/CONCERN	RESPONSE FROM HYDRO ONE
Materials	Question regarding materials to be used in access roads.	For the access roads, crushed limestone spread over geotextile would be used. This helps reduce compaction by evening out the weight of equipment travelling over the roads.
Effects to tile beds	Comment notifying Hydro One that there are three sewage tile beds located just outside the transmission right-of-way.	Comment noted and the information was shared within the Hydro One project team.
Operation		
Electric and Magnetic Fields (EMF)	EMF levels with the upgrade from 115 kV circuits to 230 kV	EMF are found everywhere electricity is used and come from home appliances, computers, office equipment, wiring in our homes and workplaces, and electric power facilities, such as substations, and transmission and distribution lines. During the Class EA process, a study on EMF levels and the proposed Project was executed. EMF and results of the EMF calculations are discussed in section 7.4.4.
	Potential health effects of EMF	Hydro One looks to the scientific expertise of organizations such as Health Canada and the World Health Organization to assess the scientific studies and provide advice and guidance. Health Canada monitors scientific research on EMFs and human health as part of its mission to help Canadians maintain and improve their health. Health Canada's conclusion about EMF is that there is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line right-of-ways. Additional information on EMF is available in section 7.4.4.

THEME	ISSUE/CONCERN	RESPONSE FROM HYDRO ONE
<p>Stray Voltage and Resonance a Health Hazard</p>	<p>Impacts of increased voltage on livestock health.</p>	<p>Information on stray voltage and information on how to request a Stray Voltage Investigation is available on the Hydro One website http://www.HydroOne.com/Request-a-service/Stray-voltage.</p> <p>In general, varying amounts of low-level voltage may exist between the earth and electrically-grounded farm equipment, such as metal stabling, feeders, or milk pipelines. Usually, these voltage levels present no harm to animals. However, if an animal touches a grounded metal object where these low voltages are found, a small electric current may pass through the animal. The voltage that causes this small current is known as “animal contact voltage,” “stray voltage” or “tingle voltage.” Stray voltage problems can be corrected.</p> <p>Stray voltage is associated with grounding issues on low-voltage distribution lines. The power lines associated with the proposed Project are high voltage (115 kV upgrading to 230 kV); therefore, we do not expect stray voltage as a result of the proposed Project.</p>

3.7 Final Notification and Draft ESR Review Period

The Final Notification (Notice of Completion of the draft ESR) was sent to First Nations communities, municipal and provincial government representatives and agencies, and potentially affected and interested persons and groups in January 2018 (see contact lists in Appendix C). The notification publicly announced that Hydro One had completed the draft ESR for the proposed Project, and was seeking input during the 30-day public review and comment period per the Class EA process. The Final Notification indicated that the draft ESR could be viewed on Hydro One's project website and the locations where hardcopies of the draft ESR could be viewed. The notification also included information on how interested parties could submit written comments to Hydro One on the draft ESR and the process for submitting a request (a Part II Order request) to the Minister of the Environment and Climate Change requesting that the proposed undertaking be subjected to a higher level assessment (an Individual EA). The Notice of Completion can be found in Appendix A2.

The Final Notification was distributed via newspaper advertisements, e-mail, and Canada Post mail. Advertisements were published in the *Barrie Advance* on January 25 and February 1, 2018, and the *Springwater News* on January 25 and February 8, 2018.

Copies of the draft ESR were available for review in hardcopy at the following locations:

- Barrie City Hall
City Clerk's Office, 1st Floor, 70 Collier Street
Tel: (705) 739-4204
- Barrie Public Library (Downtown Branch)
60 Worsley Street
Tel: (705) 728-1010
- Springwater Public Library (Midhurst Branch)
12 Finlay Mill Road
Tel: 705) 737-5650

The draft ESR was also available on the project website:

www.HydroOne.com/Projects/BarrieAreaUpgrade.

Hydro One provided a 30-day review period, from January 29 to February 27, 2018 to allow sufficient time for review and comment of the draft ESR. Comments regarding the draft ESR were submitted to Hydro One no later than 4:30 p.m. on Tuesday, February 27, 2018 to the attention of:

Sarah Cohanim, Environmental Planner
Hydro One Networks Inc.
483 Bay Street, North Tower, 12th Floor
Toronto, ON M5G 2P5

E-mail: Community.Relations@HydroOne.com
Tel: (416) 345-6799

The EA Act has provisions that allow for interested parties to ask for a higher level of assessment for a Class EA project if they feel that outstanding issues have not been adequately addressed by Hydro One. This is referred to as a Part II Order request, which was to be addressed in writing to the Minister of the Environment and Climate Change, and the Director of the EAB of the MOECC, and received no later than 4:30 pm on Tuesday, February 27, 2018.

No Part II Order requests were received to elevate this project from a Class EA to an Individual EA. However, comments were received during the 30-day draft ESR review period by government agencies and potentially affected and interested persons. Hydro One has considered all the issues and concerns identified and, where possible, Hydro One has attempted to resolve them prior to issuing the final ESR to the MOECC. The comments received on the draft ESR and Hydro One's responses and actions taken to address them are summarized in the table below. Details of the correspondence related to the draft ESR review period can be found in Appendix A3: Correspondence Log.

Hydro One received comments on the draft ESR from two government agencies as follows:

- MNRF; and
- LSRCA.

Hydro One received comments on the draft ESR from three members of the public during the review period. The following topics were raised by members of the public:

- Removal of idle wood pole line near Essa TS;
- EMF; and
- Property rights.

Table 3-2 summarizes the key issues and concerns raised throughout the draft ESR review period, and responses from the project team. Additional details can be found in Appendix A3.

Additional correspondence was received after the end of the draft ESR review period from the MOECC and the MTCS. On March 5, 2018, the MOECC confirmed that they did not need to review the draft ESR at that stage. They stated that the Class EA is a proponent-driven process and it is the proponent's, Hydro One's, responsibility to satisfy the requirements of the Class EA. On March 6, 2018, the MTCS provided a letter confirming that the Stage 2 Archaeological Assessment report had been reviewed and entered into the Ontario Public Register of Archaeological Reports. A copy of this letter is included in Appendix B2.

Table 3-2: Summary of Questions and Comments Received During the Draft ESR Review Period

Stakeholder	COMMENT	RESPONSE FROM HYDRO ONE
MNRF – Midhurst District	If temporary water crossings are required, any dewatering for the purposes of installation and removal of culverts or roads should occur during low flow periods of the in-water work timing window from July 15 to October 1.	Hydro One and its contractors will comply with these requirements. If it is not possible to respect this timing window, the MNRF Midhurst District will be contacted before moving ahead with the work. Section 7.6.3 of this ESR has been updated to reflect this comment.
	Any required tree cutting should occur from September 1 to April 5 to protect bird and bat species.	Hydro One and its contractors will comply with these requirements. If it is not possible to respect this timing window, the MNRF Midhurst District will be contacted before moving ahead with the work. Section 7.6.3 of this ESR has been updated to reflect this comment.
	If work is required in cultural meadows, it should occur from August 31 to April 5 to be outside the breeding bird timing window. If work must occur within this timing window, species surveys would be a required prerequisite. Should SAR birds be present, advice should be sought from MNRF’s Midhurst District staff.	Hydro One and its contractors will comply with these requirements. Section 7.6.6 of this ESR has been updated to reflect this comment.
	Hydro One should consult with the aggregate pit licensees to ensure potential impacts from the project to their operation have been considered. If the works require any changes to the operations or the rehabilitation of the site, the operator would be required to make amendments to the site plan for the licence prior to construction. MNRF provided a contact if Hydro One has any questions regarding the aggregate operations or the site plan amendment process.	Hydro One has consulted with the aggregate pits during the Class EA process and will continue to do so moving into construction. Any questions Hydro One and its contractor(s) have will be directed to the MNRF contact provided.
LSRCA	The transmission line crosses some wetland, woodland, as well as Dyments Creek (twice), and an area identified as a flood hazard area. There also appears to be wetland and woodland within the Hydro One property where the Transformer Station is located in Barrie. All of the natural heritage features are identified as Level 1 or Level 3 features on Schedule H of the City of Barrie Official Plan. Different parts of the corridor are also identified within a significant groundwater recharge area, an area of highly vulnerable aquifer and/or a well head protection area.	Comment noted. See section 4 for the environmental features within the study area.
	LSRCA recommended that as part of the Environmental Assessment a mitigation hierarchy be applied that would	Comment noted. See section 7 for potential effects and the mitigation measures that will be employed.

Stakeholder	COMMENT	RESPONSE FROM HYDRO ONE
	<p>include avoidance, minimization and mitigation for any identified impacts to natural heritage features in the study area. If there are any unavoidable impacts, they recommend an approach of ecological offsetting to replace any loss of natural heritage feature with an objective of 'net gain' for ecological value. Any work proposed within the regulated floodplain should ensure no net loss in flood storage capacity, conveyance, or increase in hazard on adjacent properties.</p> <p>LSRCA acknowledged that compensation for loss of features is addressed in the draft ESR and also that flow conveyance and hydraulics are addressed as well. LSRCA requested that wording be included to state that work will be carried out in consultation with the LSRCA and incorporate feedback into design and construction. Also, that consultation is required with the LSRCA for works within their regulated areas.</p>	<p>Comment noted. Sections 4.6.3, 7.6.3 and 7.6.6 of this ESR and Table 7-1 have been updated to reflect this comment.</p>
Property Owner	Property owner expressed concerns about the “radiation levels” from the replacement of 115 kV to 230 kV, and requested data on the health impacts and distance required from a residential house or business.	<p>The mandatory clearance required from the conductors (wires) to the ground would be 4 m for this transmission line. The International Commission on Non Ionizing Radiation Protection (ICNIRP) provides a limit of EMF exposure, rather than a distance. Section 7.4.4 provides the ICNIRP limit and describes the changes to EMF levels as a result of the proposed Project.</p> <p>Hydro One provided supplementary information, i.e., home sources of EMF and the Health Canada Fact Sheet (see Appendix D).</p>
Property Owner	Property owner expressed concerns regarding their specific property easement.	Comment was noted and Hydro One will continue discussions with the property owner.
Property Owner	Question regarding whether the idle circuit S2E pole line which traverses through the subdivision at Parr Boulevard in the Township of Springwater can be removed.	Removal of the circuit S2E wood pole line is not part of the scope of this proposed project. This line provides an important communications link between Essa TS and Parry Sound TS via the Optical Ground Wire (OPGW) that runs along the top of these structures. While the conductors are idle, the communication link is active and the structures will remain in place for the foreseeable future.

3.8 Statement of Completion

Hydro One has incorporated all comments received during the 30-day review period into this ESR. No Part II Order requests were received.

This ESR has been placed on the project website and sent to the EAB at the MOECC and the appropriate Regional EA Coordinator for filing. On March 23, 2018, Hydro One submitted a Statement of Completion form to the MOECC along with this finalized ESR. A copy of the Statement of Completion form is in Appendix E.

The proposed Project is now considered acceptable and can proceed as outlined in this ESR.

4 Environmental Features in the Study Area

As described in the Class EA process information from within the Project study area was collected for the following:

- Agricultural resources;
- Forestry resources;
- Cultural heritage resources (i.e., built heritage resources, cultural heritage landscapes and archeological resources);
- Human settlements;
- Mineral resources;
- Natural environment resources (e.g., air, land, water, wildlife);
- Recreational resources; and
- Visual and aesthetic resources (i.e., appearance of the landscape).

The following sections summarize the environmental baseline conditions in the study area. The study area is illustrated in Figure 2-1. Information presented below was obtained through literature review, reports commissioned by Hydro One, specialized consultants, online resource databases and mapping, consultation with stakeholders and agencies, and through the completion of targeted natural heritage field surveys.

Arcadis Canada Inc. was retained by Hydro One on this project to provide support and carry out technical studies. Field investigations were completed between June 2016 and June 2017. Results of the field surveys and value/significance interpretations of natural heritage features are presented in summary below and in Appendix B.

4.1 Agricultural Resources

The Canada Land Inventory (CLI) rates agricultural land capability. According to CLI data (1998), the study area traverses Class 7 lands, which have no capability for arable culture or permanent pasture; Class 5 lands, which have very limited capability for arable agriculture or permanent pasture; Class 4 lands, which have severe limitations; Class 3 lands, which have moderately severe limitations that restrict the range of crops or require special conservation practices; and organic soils (see Figure 4-1).

A portion of the study area traverses protected areas which consist of soils that are classified as organic, and entirely restricts the growing of crops. Due to the designation as a protected zone, these soils are not placed in capability classes (Ministry of Agriculture, Food and Rural Affairs, 2017). Examination of satellite imagery, the Ecological Land Classification (ELC), and observations made during the terrestrial field survey confirm the presence of areas of agricultural fields throughout the study area, specifically at the intersection north of County Road 90 and just east of George Johnston Road, north of County Road 90 and east of Grenfel Road, and immediately northwest of Essa TS. They are actively managed and are either hay fields or planted row crops, such as soybean and corn.

4.2 Forestry Resources

Based on a review of the MNRF Land Information Ontario (LIO) database, no Forestry Management Units, Agreement Forest Areas, Forest Cover Units, Forest Resource Inventory Areas, or Wood Use Areas Forest Resources (as identified through the MNRF Forest Resource Inventory) overlap the study area (MNRF, 2017a). Consequently, there is no potential for the proposed Project to affect the productivity or utilization of the land for forestry harvesting.

4.3 Cultural Heritage Resources

Provincial heritage properties include three types of cultural heritage resources: built heritage resources, cultural heritage landscapes and archaeological sites (Ministry of Tourism, Culture and Sport [MTCS], 2010). A licensed archaeologist was retained to conduct a heritage review and archaeological assessments.

A Built Heritage Resource Background Review (AECOM, 2016) was conducted which followed the process for Identification of Cultural Heritage Resources outlined in the Standards and Guidelines for Conservation of Provincial Heritage Properties (MTCS, 2010). Research and analysis, consultation with the Township of Springwater, City of Barrie and the Barrie Historical Society along with fieldwork was completed. The conclusion of the review was that no Built Heritage Resources or Cultural Heritage Landscapes reflecting the historic character of the area were identified within the proposed Project study area.

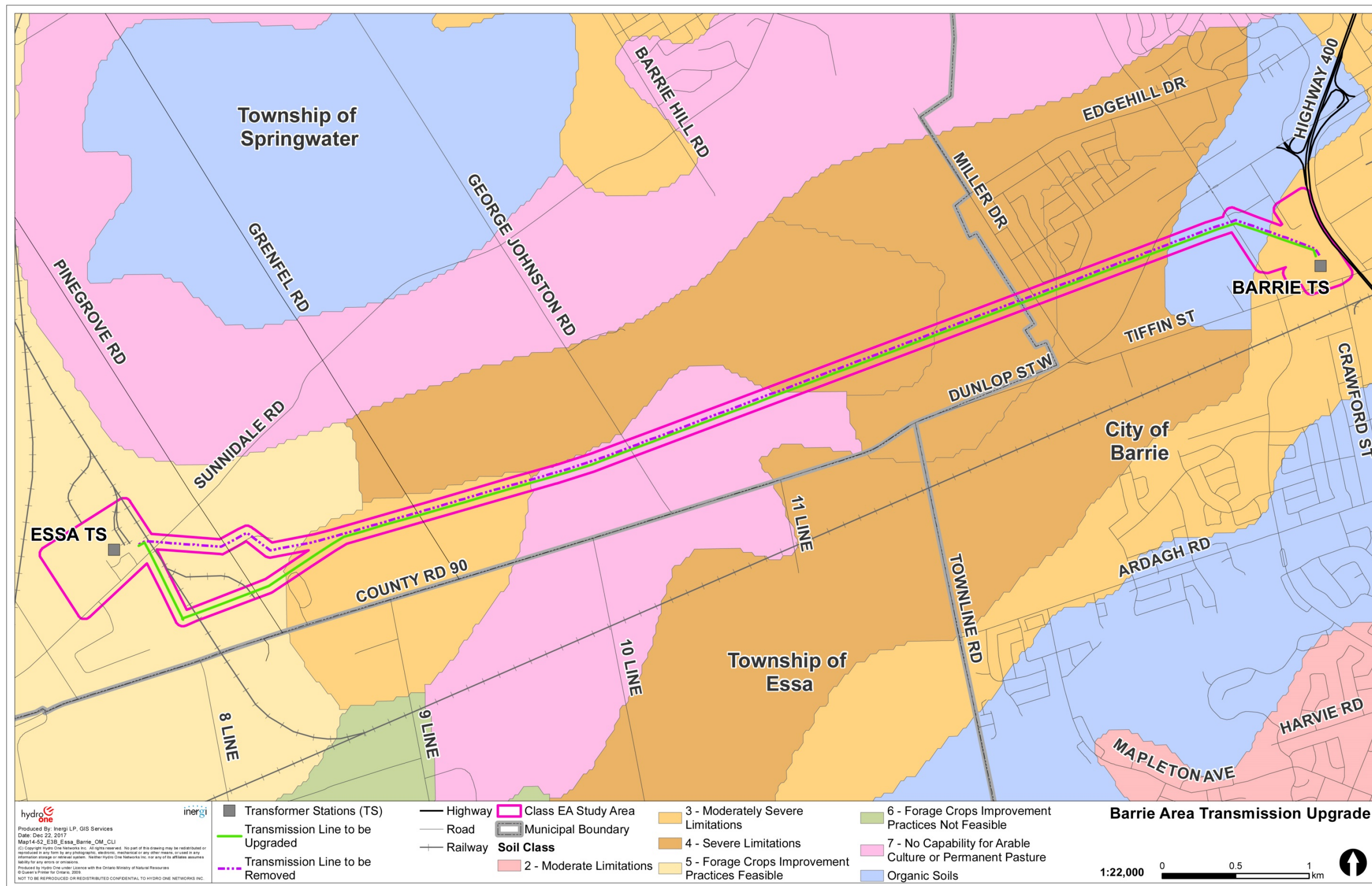


Figure 4-1: Agricultural Soil Classes

A Stage 1 archaeological assessment was conducted in accordance with the MTCS Standards and Guidelines for Consultant Archaeologists (2011a) by a licenced archaeologist. The results of the Stage 1 archaeological assessment were provided to the MTCS and entered into the Ontario Public Register of Archaeological Reports. The Stage 1 archaeological assessment (AECOM, 2017a) determined that the proposed Project study area contains lands with archaeological potential and recommended that a Stage 2 archaeological assessment be completed on those lands.

A Stage 2 archaeological assessment (AECOM, 2017b) was conducted from June 1, 2017 to October 12, 2017 for land deemed to have archaeological potential within the study area. A field representative from the Huron-Wendat accompanied the licensed archaeologists during the majority of the Stage 2 archaeological assessment. In accordance with the MTCS Standards and Guidelines for Consultant Archaeologists (2011a), the Stage 2 archaeological assessment involved test pitting and pedestrian surveys. The Stage 2 archaeological assessment did not result in the identification of any archaeological materials. Therefore, the entire right-of-way between Essa TS and Barrie TS and the station properties are considered free of archaeological concern. The final report for the archaeological assessment was submitted to the MTCS on November 13, 2017. On March 6, 2018, the MTCS confirmed that the Stage 2 Archaeological Assessment had been reviewed and entered into the Ontario Public Register of Archaeological Reports.

Cultural heritage reports are provided in Appendix B1 to B3.

4.4 Human Settlements

The study area is located within the suburban area of the Township of Springwater and the urban area of the City of Barrie, mostly consisting of residential and commercial areas. The entire study area contains a mixture of commercial, open, agricultural, residential, and resource/industrial areas. In general, according to the Statistics Canada 2016 Census, the Township of Springwater has a population of 19,059 people and a land base of 536.28 square kilometres (km²), and the City of Barrie has a population of 141,434 people, and a land base of 99.04 km². Both municipalities are located within the County of Simcoe, which has a total population of 479,650 and land area of 4,859.64 km² (Statistics Canada, 2017).

The transmission right-of-way is adjacent to agricultural and environmental protection zones within the Township of Springwater and adjacent to residential neighbourhoods, commercial uses, and industrial uses in the portion of the project located in the City of Barrie. The industrial area in the eastern part of the study area, located near Highway 400, contains some office buildings and light industrial businesses.

There are no schools or places of worship situated within 1 km of the study area. The nearest park is Pringle Park, a community park situated at the centre of a residential area and located approximately 800 m north from the study area. The nearest recreational areas and/or community centres are the Grenfel Community Hall in the Township of Springwater, which is located approximately 660 m north of the study area, and the Bear Creek Eco Park (a natural area), located approximately 550 m to the southwest of Barrie TS. There are approximately 65 residential dwellings that back onto the transmission right-of-way. The majority of the residential development is comprised of single detached dwellings.

4.4.1 *Land Use Planning*

With respect to existing land use designations, land uses in a portion of the study area are guided by the PPS, the Township of Springwater Official Plan (1998) and the Springwater Comprehensive Zoning By-law 5000 (2014), and the City of Barrie Official Plan (2017), which is regulated by the City of Barrie Comprehensive Zoning By-law (2016). The PPS provides the Government of Ontario's policy direction on land use planning to promote strong communities, a strong economy, and a clean and healthy environment (e.g., the efficient management of land and infrastructure, the protection of resources, and appropriate employment and residential development). The Township of Springwater Official Plan, the City of Barrie Official Plan and other planning documents are required to comply with the PPS to ensure consistency. Land use maps from the Township of Springwater Official Plan and the City of Barrie Official Plan are provided in Appendix C1.

No provincial land use plans, such as the Greenbelt Plan or the Niagara Escarpment Plan, are applicable to the study area.

Township of Springwater

The proposed Project is consistent with the Township of Springwater Official Plan (1998) which states that, “all opportunities to use, expand or upgrade existing infrastructure and public facilities to accommodate growth will be evaluated and, where practicable, utilized before developing new infrastructure and public facilities.” The designated land uses for the portion of the study area which is located within the Township of Springwater are provided below.

The Agricultural Land designation indicates that “the predominant use of land in areas so designated shall be general and specialized agricultural uses including buildings and structures normally accessory to an agricultural use such as a dwelling, barns and sheds” (Township of Springwater Official Plan, section 17.3). However, “the planning and location of utility corridors, lines, towers and associated uses, shall wherever possible, respect the intent of [the Official Plan] which is to protect and preserve existing and potentially productive agricultural land to the greatest extent possible” (Township of Springwater Official Plan, section 17.4.12).

The Environmental Protection designated lands are classified under Category 1 and Category 2 Lands. Category 1 Lands “may primarily be characterized as undeveloped natural areas of high environmental quality and significance and/or sensitivity.” Category 2 Lands “may be characterized as areas of lesser environmental significance and/or sensitivity, although areas of high environmental quality may also be present. Category 2 Lands also presently contain lands/or waters previously altered or impacted (i.e. former agricultural or aggregate extractive areas) and developed areas which exhibit a variety and mix of existing uses” (Township of Springwater Official Plan, section 16.2.1.1).

The Industrial Land designation permits the following land uses: “manufacturing, assembly, processing of goods, service industries, research and development facilities, warehousing, storage of goods and materials, freight transfer, transportation facilities, automotive and vehicle repair; office buildings, restaurants, wholesale outlets and personal and professional service uses” (Township of Springwater Official Plan, section 12.2.1).

City of Barrie

Section 5.1.2.1 of the City of Barrie Official Plan (2017) permits public utilities, including the electrical power utility, in any land use designation of the Plan. The proposed Project is consistent with the Official Plan, which encourages intensification and the use of currently existing infrastructure. The designated land uses for the portion of the study area which is located within the City of Barrie are provided below.

The Highway Industrial designation covers the land on which Barrie TS is located, at the eastern extent of the study area, to the immediate west of Highway 400. The designation in the Official Plan appears as “Highway 400 Industrial.” Where this designation applies, “the predominant use shall be for prestige industrial and office based uses” (City of Barrie Official Plan, section 4.4.2.4).

The General Industrial designation and land use policy (which also applies to the “Light Industrial” designation category [section 4.4.2.2 of the City of Barrie Official Plan]) covers the study area from Sarjeant Drive through to the east of Dunlop Street West, and a small portion to the immediate west and the immediate north and east of Dunlop Street West. The General Industrial applies where “the predominant use shall be for manufacturing, processing, servicing, storage of goods and raw materials, industrial warehousing and similar such uses” (City of Barrie Official Plan, section 4.4.2.2). General Commercial designated lands “are intended to provide a range of retail and service commercial uses” (City of Barrie Official Plan, section 4.3.2.5). This designation covers the study area immediately to the east of Dunlop Street West.

The Environmental Protection Area designation covers a section of the study area to the west of Dunlop Street West. The Environmental Protection Area designation facilitates the identification, protection and enhancement of “natural heritage features and areas and their connecting linkages including the land, air and water and the life they support for the benefit of future generations by encouraging and, where necessary, only allow land uses which protect the natural heritage features and functions of Environmental Protection Areas” (City of Barrie Official Plan, section 3.5.1).

The Residential Hold and Residential Single Detached Dwelling First Density designations fall under the Residential land use policy (City of Barrie Official Plan, section 4.2). These designations cover the study area located in the vicinity of Miller Drive and Dunlop Street West. Where lands are designated Residential, “the predominant use shall be for all forms and tenure of housing which may include senior citizen housing, nursing homes, bed and breakfast establishments and group homes (City of Barrie Official Plan, section 4.2.2.1).

The land uses within the study area are also regulated by the City of Barrie Comprehensive Zoning By-law (2016); however, utilities such as electricity transmission lines are not subject to the provisions of the Zoning By-law (City of Barrie By-law 2009-141, section 4.2.1).

4.4.2 Transportation

The transmission right-of-way crosses road transportation infrastructure; however, it does not cross any major provincial highway.

The Township of Springwater Official Plan (1998) identifies the following arterial roads located within the study area:

- George Johnston Road;
- Grenfel Road; and
- Pinegrove Road.

The City of Barrie Official Plan (2017) identifies the following arterial roads within the study area:

- Ferndale Drive North;
- Dunlop Street West;
- Miller Drive; and
- Tiffin Street.

The study area does not cross any rail lines. There is a former rail line in the western portion of the study area adjacent to Essa TS but is now used as a trail.

The proposed project is approximately 3.5 km south of the Springwater Barrie Airpark.

4.4.3 *First Nation Lands and Territory*

There are no First Nation Reserve Lands located in the study area (MNR, 2017b). The closest First Nation reserve is the Chippewas of Georgina Island reserve located approximately 18 km east of the project study area. The Ministry of Energy determined that the project may result in adverse impacts on the asserted or established rights of four First Nation communities – Beausoleil First Nation, Chippewas of Georgina Island, Chippewas of Rama First Nation and Huron-Wendat. Potential effects of the proposed project on First Nations lands and territories are discussed in section 7.

4.5 Mineral Resources

Based on a review of the MNR LIO database, and observations made during the terrestrial field survey, there are active aggregate pits and quarries located within the study area (Appendix C2). Examination of satellite imagery and the ELC indicates that there are two areas in the right-of-way used for the extraction of aggregate along Pinegrove Road near Essa TS, which correspond with the LIO database results.

No active or abandoned mines were identified within the study area or on adjacent lands (Ministry of Northern Development and Mines [MNDM], 2017a). No oil and gas wells were identified in the study area.

4.6 Natural Environment Resources

This factor considers areas of environmental sensitivity including the air, land, water and wildlife resources and features within the study area. The assessment is based on the requirements outlined in the PPS (2014) and following the *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement* (MNR, 2010).

Baseline information regarding the following physical and biological features in the study area is discussed:

- Physical environment;
- Atmospheric environment;
- Surface and groundwater resources;

- Designated or special natural areas; and
- Natural heritage features.

4.6.1 *Physical Environment*

The study area is located in the Simcoe Lowlands physiographic region of Ontario as defined by Chapman and Putnam (1984). The Simcoe Lowlands are a series of steep sided, flat-floored valleys which were flooded by glacial Lake Algonquin. The area is bordered by beaches and boulder terraces, and is lined by sand, silt, and clay. The study area is located within the Nottawasaga Basin portion of the Lowlands.

The physiographic landforms of the study area consist mostly of sand plains along the entirety of the right-of-way, with the exception of a very small patch of beaches (beach ridges and near shore bars) approximately 350 m to the west of Grenfel Road, where the right-of-way intersects at Pinegrove Road, and just north of County Road 90 to the west of Pinegrove Road (Chapman and Putnam, 1984).

The surficial geology of the study area is dominated along most of the right-of-way by fine to coarse-textured glaciolacustrine deposits (foreshore and basinal deposits) comprised of silty sands to sands, gravel, and minor silt and clay (see Figure 4-2). Coarse-textured glaciolacustrine deposits (littoral deposits) composed of sand, gravel, minor silt, and clay are present in the east portion of the study area at Miller Drive in the City of Barrie. Similar deposits are present in the west portion of the study area near Essa TS and situated to the south of Sunnidale Road, to the east of Parr Boulevard, to the north of County Road 90 and to the west of Grenfel Road. Organic deposits containing peat, muck, and marl are present in the study area east of Pringle Drive and west of Dunlop Street West (Chapman and Putnam, 1984; MNDM, 2017b). The basin in the vicinity of the study area is underlain by silts and clays between 9 and greater than 15.9 metres below ground surface (mbgs). Near-surface geology within the study area is described in more detail in section 4.6.3.

The bedrock in this area is comprised of interbedded limestone, dolostone, shale, arkose, and sandstone of the Middle Ordovician Simcoe Group (MNDM, 2017b).

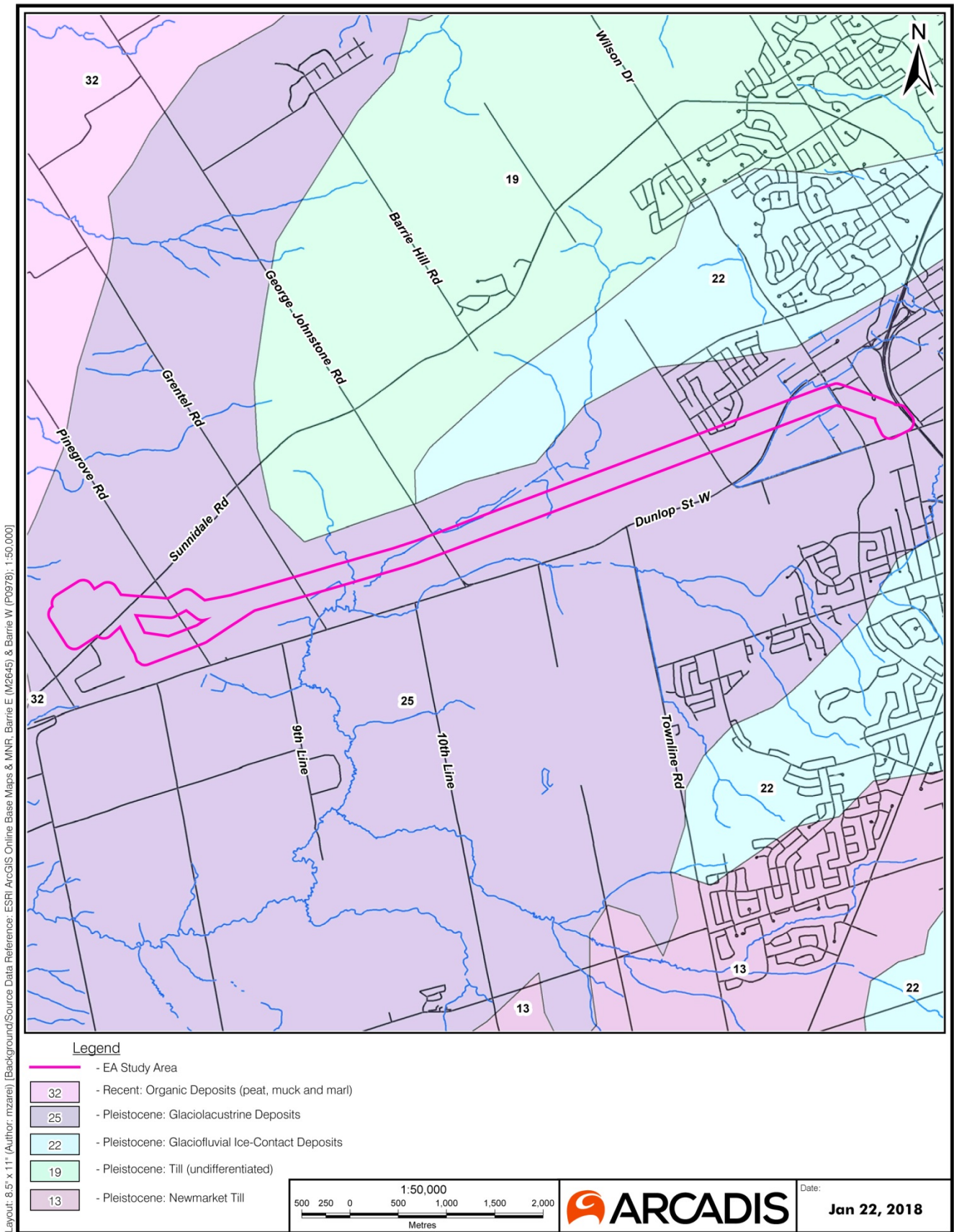


Figure 4-2: Quaternary Geology

4.6.2 *Atmospheric Environment*

Climate

The Township of Springwater and the City of Barrie are located within the Great Lakes/St. Lawrence climate region and experience humid continental climate conditions with influence from the surrounding Great Lakes (Environment and Climate Change Canada [ECCC], 2017a). The closest ECCC meteorological station with sufficient temperature and precipitation data, the Essa Ont Hydro meteorological station (Climate Identifier [ID] 6112340), is located within 1 km to the west of the study area. Temperature and precipitation data presented in this section is based on the available 1981-2010 Climate Normals data (ECCC, 2017a).

The climate normal mean annual temperature at the Essa Ont Hydro meteorological station is 6.8 degrees Celsius (°C). The climate normal daily average temperature varies between -7.4 °C (January) and 20.2 °C (July). Extreme climate normal temperatures range from -37.5 to 36 °C. The climate normal frost-free period is from May 19 to September 30 (133 days).

Precipitation is distributed throughout all four seasons, with snowfall typical from November to April, and rainfall typical from May to October. Climate normal days with precipitation is 156 days per year.

Climate normal monthly precipitation varies between 54 millimetres (mm) (March) and 99.7 mm (September). The climate normal total annual precipitation is 911.6 mm, where 213.7 mm typically falls as snowfall and 697.9 mm as rainfall. Extreme daily rainfall depths from 29.5 mm (December) to 91.2 mm (July) are climate normal. Extreme snow depths range from zero to 70 centimetres (cm) (February).

The closest ECCC meteorological station with sufficient wind data is Egbert CS (World Meteorological Organization Station Identifier [ID] 71296) and is located approximately 14 km south of the study area (ECCC, 2017b). The following wind rose, presented in Figure 4-3, represents five consecutive years of data, January 1, 2012 to December 31, 2016, at the ECCC climate station (Egbert CS, ID 71296). At this location, winds are primarily blowing from the northwest and south with an average wind speed of 3.13 metres per second (m/s).

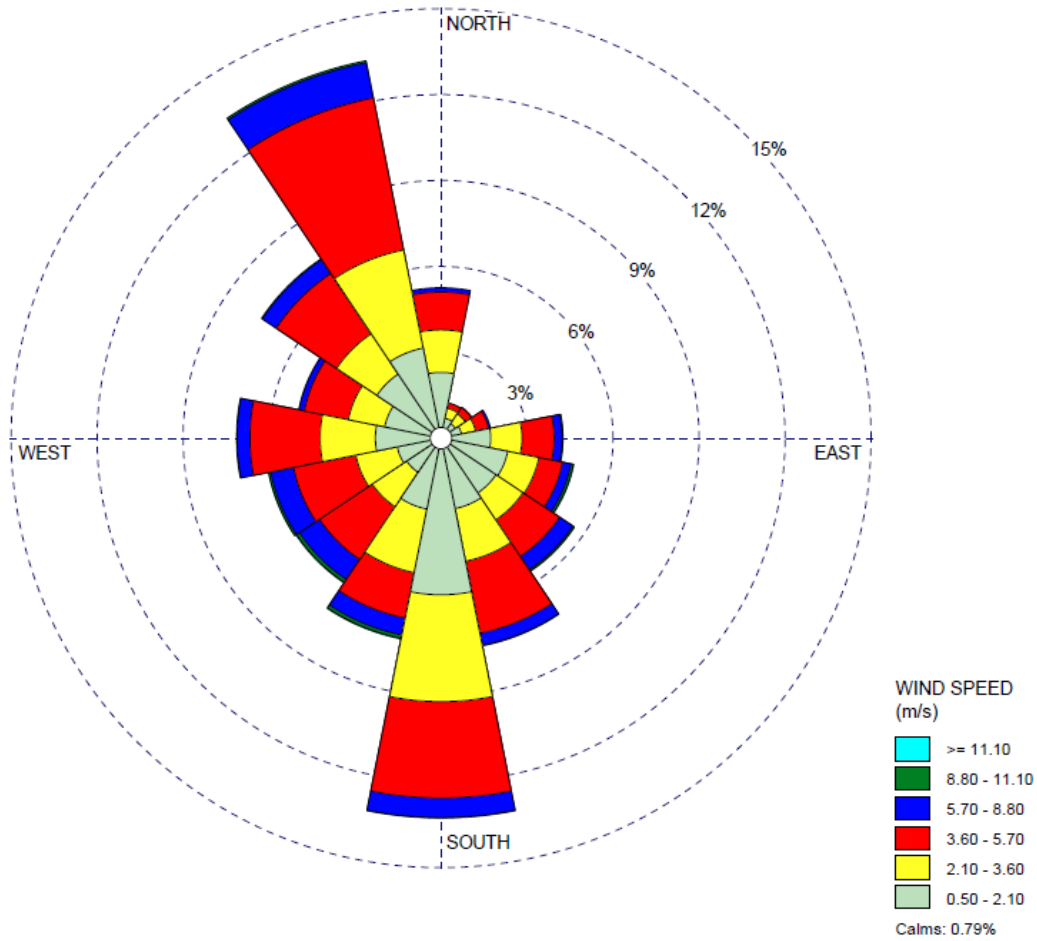


Figure 4-3: Wind Speed Direction (Blowing From) from 2012-2016 at the Egbert CS Meteorological Station

Air Quality

In Ontario, regional air quality is monitored through a network of air quality monitoring stations operated by the MOECC and ECCC National Air Pollution Surveillance (NAPS) program. The nearest station is approximately two km northeast of the study area (NAPS Station ID 65001 – Barrie). Background air quality levels for nitrogen dioxide (NO₂) and PM_{2.5} are based on monitored air quality measurements from this station for the year 2016. The closest NAPS station that monitors sulphur dioxide (SO₂) and carbon monoxide (CO) is the Toronto West station (NAPS Station ID 60430) and is located approximately 74 km south of the study area. Air monitoring data from these stations represents the combined effect of emissions from nearby sources, as well as the effect of emissions transported into the region.

Air quality criteria used for assessing ambient air quality in the study area includes provincial criteria, and federal standards and objectives where provincial criteria are not available. Specifically, the MOECC has issued guidelines related to ambient air concentrations, which are summarized in Ontario’s Ambient Air Quality Criteria (AAQC) which are applied to CO, NO₂, suspended particulate matter (SPM), particles of 10 micrometres or less (PM₁₀), and SO₂ (MOECC, 2016a). Contaminants which do not have an AAQC, namely particles of 2.5 micrometres or less (PM_{2.5}), are compared to the Canadian Ambient Air Quality Standards (CAAQS).

Table 4-1 presents the background air quality values of the available monitoring data closest to the proposed project area. The 90th percentile of the available monitoring data was used to represent background air quality for parameters with 1-hour, 8-hour and 24-hour averaging periods. Annual background values are based on the mean of the available hourly data. As presented in Table 4-1, all monitored values are below their respective regulatory criteria.

Table 4-1: Criteria Air Contaminant Monitored Data in 2016

Monitoring Station	Criteria Air Contaminant	Averaging Period	Regulatory Document	90 th Percentile of Monitored Data (µg/m ³)	Regulatory Criteria	Percentage of Regulatory Criteria
					(µg/m ³)	
Toronto West	CO	1-Hour	Ontario AAQC	412	36,200	1%
		8-Hour	Ontario AAQC	395	15,700	3%
	SO ₂	1-Hour	CAAQS	3	170**	2%
		24-Hour	Ontario AAQC	3	275	1%
		Annual	CAAQS	2	10**	17%
Barrie	NO ₂	1-Hour	Ontario AAQC	58	400	15%
		24-Hour	Ontario AAQC	45	200	23%
	SPM*	24-Hour	Ontario AAQC	49	120	40%
		Annual	Ontario AAQC	26	60	44%
	PM ₁₀ *	24-Hour	Ontario AAQC	24	50	49%
	PM _{2.5}	24-Hour	CAAQS	12	27***	45%
		Annual	CAAQS	7	8.8***	74%

*Estimated based on a ratio of monitored PM_{2.5} values; **SO₂ 1-hour and annual values are compared to pending 2025 values; *** PM_{2.5} 24-hour and annual values are compared to pending 2020 values.

Noise and Vibration

A desktop review of publicly available data was completed to identify noise-sensitive receptors within the study area, and to establish existing noise conditions. Existing land uses within the study area consist of a mixture of agriculture, commercial, open area, residential, resource/industrial and environmental protection (see section 4.4.1 for more details about land uses in the study area). In accordance with the MOECC publication NPC-300 “Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning” noise-sensitive receptors, or points of reception, are defined as sensitive land uses, which include dwellings; institutional use (educational, nursery, hospital, health care facility, community centre, place of worship or detention centre); and commercial use (hotel or motel) (MOECC, 2016b). A number of points of reception were identified to represent the noise-sensitive receptors in the vicinity, all being residential dwellings.

Ambient noise conditions within the study area were established through a review of publicly available information and the professional opinion of Hydro One’s environmental consultant based on experience on similar projects. Ambient noise conditions within the study area are generally expected to be dominated by anthropogenic activities. These activities include, but are not limited to, transportation (road, rail and distant air traffic), light industrial activities, commercial activities, and residential activities. The actual ambient noise levels at a given point of reception depend on a number of factors, including type of noise source, distance to the noise source, and influences from intervening areas (e.g., structures, woodlots, topography) that could provide shielding between the noise source and point of reception. Ambient noise levels are expected to vary throughout the various periods of the day (i.e., Daytime [07:00-19:00], Evening [19:00-23:00], and Night-time [23:00-07:00]), days of the week, and seasons of the year.

Ambient noise levels in the study area are likely influenced by the following noise emissions:

- Local and distant road traffic, particularly along Highway 400, Highway 90, and Dunlop Street West; and
- Industrial, commercial and residential activities.

Vibration can be a by-product of construction activities. Some activities during the construction phase of the proposed Project with the ability to result in vibration include demolition, soil compaction, excavation of foundations, and heavy equipment use. No heritage structures and or vibration-sensitive facilities have been identified within the study area.

4.6.3 *Surface Water Resources*

Based on a review of aerial photography and available base mapping, there are three small creeks and a large drain at Dunlop Street West that cross the study area (Figure 4-4). Small portions of the wetland in the vicinity of the study area have been converted to agricultural use, and Bear Creek and its tributaries traverse portions of these lands, within the study area and beyond. However, there are wide swaths of wetland areas that are a part of the Bear Creek PSW, which is described in more detail below in section 4.6.5. The topography within the study area is relatively flat, with a general slope to the south to southeast (Figure 4-5). The Bear Creek PSW lies within the Middle Nottawasaga River subwatershed, which is underlain by fine to medium-textured glaciolacustrine deposits within the planar region that lies between the City of Barrie boundary and the Minesing flats at the west end of the study area. The Minesing swamp is located a couple hundred metres west of the western terminus of the study area. The subwatershed is characterized by Bear Creek, which emerges from tributaries within the glacial feature of the Algonquin Highlands to the north of the study area, creating a headwater system which subsequently flows into the wetland. Three tributaries of Bear Creek cross the study area. Outflow temperatures are typically cool and low-flow riffles are created. There is one pool of standing water partially within the study area.

The Bear Creek PSW is classified as a palustrine system which indicates the lack of connectivity to large and/or free-flowing waterbodies. As such, wetlands within the Bear Creek PSW complex are hydrologically connected through standing surface water, and to the small tributaries of Bear Creek that pass through the study area. Due to deep water table depths, it is likely that regional groundwater discharge to surface watercourses is limited at the wetland as evidenced by local perched groundwater systems. Instead, the wetland has been identified to significantly contribute to groundwater recharge where portions drain

towards municipal wells. Large portions of the wetland have standing water or water essentially at ground surface for most of the year.

There are no surface water quality monitoring stations within or in the vicinity of the study area. The nearest Provincial Water Quality Monitoring Network (PWQMN) Station is the Bear Creek Station (No. 3005703502), located approximately 2.5 km southwest of the study area in the Township of Essa. This monitoring location is part of the Bear Creek Subwatershed, which was characterized by the NVCA as having an overall 'C' Stream Health grade in their 2007 Report Card in the Nottawasaga Valley Source Protection Area Approved Assessment Report (NVSPA-AAR) (NVCA, 2015), which grades the stream health with respect to several indicators, including benthic indices, total phosphorous, total suspended solids, and *Escherichia coli* (E. coli) counts.

The three small watercourses which traverse the study area are located as follows:

- Approximately 570 m east of Grenfel Road;
- Approximately 950 m east of Grenfel Road; and
- Approximately 1.2 km east of George Johnston Road.

The third watercourse may not actually enter the right-of-way, but may arise out of the wetland just south of the study area. All three of the watercourses flow to Bear Creek, south of the study area, in the vicinity of Highway 90 (Figure 4-4).

All of the creek tributaries are flowing through areas mapped as wetland in the MNRF database; however, are barely discernible on aerial photography.

Conservation Authorities regulate development and activities in or adjacent to river or stream valleys, Great Lakes and inland lakes shorelines, watercourses, hazardous lands and wetlands. LSRCA and NVCA Regulated Areas are located within the Project study area (see Appendix C5).

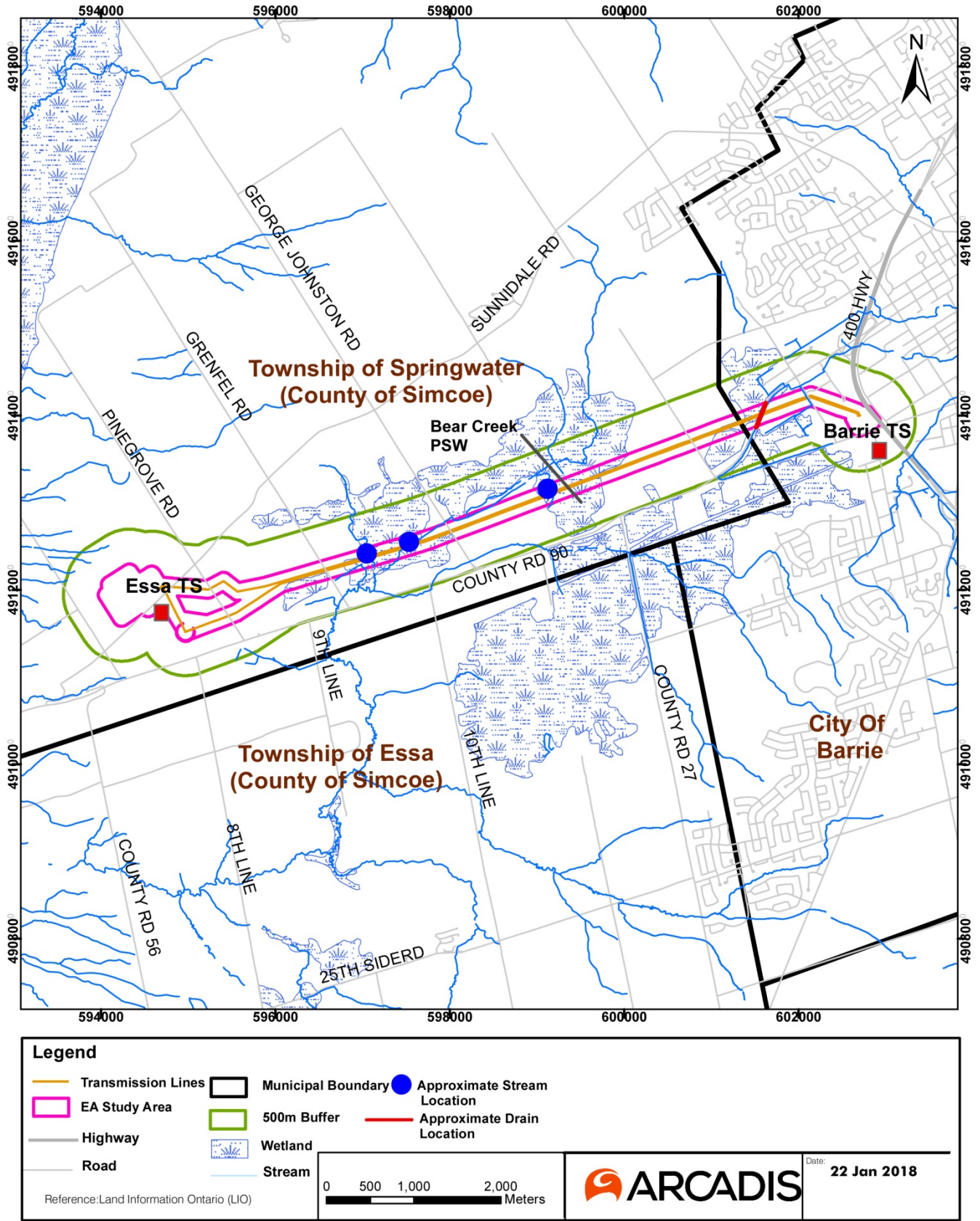


Figure 4-4: Surface Water Features

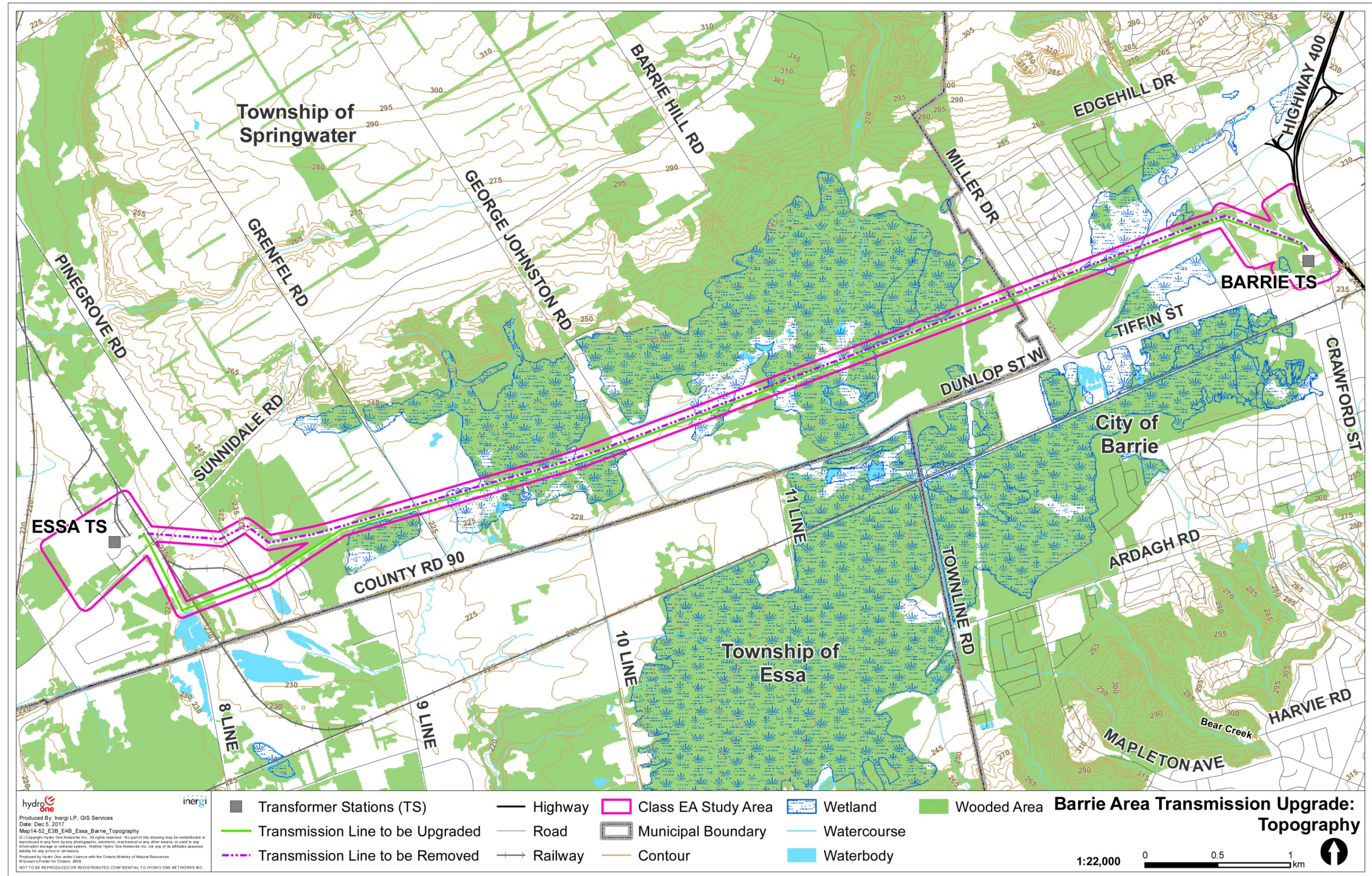


Figure 4-5: Topography

4.6.4 *Groundwater Resources*

Groundwater resources were evaluated within the study area, as well as a 500 m radius from the study area to effectively capture potential effects on groundwater resources from the proposed Project. The quaternary soil deposits underneath the wetlands and other corridor lands are mapped as fine to coarse glaciolacustrine deposits (Chapman and Putnam, 1984). The results of the 2017 geotechnical investigation (Hemmera, 2017) indicate that the corridor is underlain by 10 to 20 cm of dark brown damp topsoil, which is dominantly underlain by glaciolacustrine fine sands, silty sands and silts to depths of between 9 mbgs and greater than 15.9 mbgs, where a silty clay deposit is encountered. At one borehole location, silty clay was encountered near the surface and then again between 9 mbgs and the terminus of the borehole at 15.7 mbgs. The near-surface soils (to 16 mbgs) are generally damp to wet, and loose to compact to stiff, with blow counts in the $n=0$ to $n=64$ range.

A review of the water well records for the area indicates that there have been a large number of water wells drilled within the study area and including a 500 m radius from the limits of the study area (see Appendix C3). There are very few water wells drilled to depths within the upper 16 mbgs; based on the stratigraphy described above, the soils are likely to be very low yield, insufficient to provide enough water for domestic or agricultural use. The majority of reviewed water well records were advanced to depths between 25 and 52 mbgs, with a lesser amount in the 12 to 25 mbgs range, and installed in fine to coarse-grained granular sediments. Yields range greatly, depending on the aquifer being exploited, but can range from 5 litres per minute (L/min) to greater than 300 L/min (MOECC, 2017). Excerpted summary water well records from the study area are presented in Appendix B6.

There are no municipal drinking water supplies within the study area or within a 500 m radius. The aquifers in the study area and vicinity have been mapped as having a medium to high vulnerability index, based on the sandy nature of the near-surface soils, the land use and population density, and the existence of shallow water supplies in the area.

Groundwater Hydrology

The western portion of the study area is located within the Springwater subwatershed of the Nottawasaga Valley Watershed Source Protection Area (NVWSPA). The NVWSPA Source Protection Committee does not identify wellhead protection areas or intake protection zones

in the vicinity of the western portion of the study area (NVCA, 2015). However, there is a municipal wellfield located immediately west of the western terminus of the study area, denoted the Vespra Downs wellfield. The corresponding Wellhead Protection Area (WHPA) crosses the westernmost portion of the study area, with portions of the 2-year Time of Travel and 5-year Time-of-Travel zones of the WHPA being within the study area (see Appendix C3).

The Vespra Downs wellfield is comprised of two wells – Well No. 1 and Well No. 2. Water Well Records for the municipal wells could not be identified in the MOECC Water Well Information System (WWIS). Well No. 1 acts as the primary pumping well, and Well No. 2 acts as the back-up well. Wells No. 1 and 2 were constructed in 1993 and 1991, respectively. The Vespra Downs water supply was drilled into a confined sand and gravel aquifer, encountered at a depth of 57 mbgs. Well No. 1 was drilled to a depth of approximately 70.4 mbgs and screened from 58.2 mbgs to 64.3 mbgs. Well No. 2 was drilled to a depth of approximately 60.7 mbgs and screened from 57.6 mbgs to 60.7 mbgs. They are permitted to pump 450 cubic metres per day (m^3/day) or 313 L/min. The groundwater vulnerability for the municipal water supply aquifer within the WHPA is considered to be low (NVCA, 2015).

The eastern terminus of the study area, starting just east of Miller Drive, is within the western limits of the Lakes Simcoe and Couchiching-Black River Source Protection Area. City of Barrie Well No. 7 (MOECC Well No. 5709125) is within the study area, while Well Nos. 17/18 (MOECC Well Nos. 5737496 and 5739442), and Well No. 5 (MOECC Well No. 5700271) are within the 500 m radius from the limits of the study area. Portions of the WHPA-A Zone (100 m radius of wellhead), WHPA Zone B - the 2-year Time of Travel, and WHPA Zone C – the 5-year Time-of-Travel zones of the WHPA are within the 500 m water resources study radius from the general study area (see Appendix C3). Well Nos. 7 and 17/18 are constructed within the deeper combined A3/A4 aquifer, while Well No. 5 is installed in the deep A4 aquifer unit. The discrete A3 aquifer ranges from 150 to 195 m above sea level (masl) in most areas, while the A4 aquifer, where discrete, ranges from 115 to 160 masl. All of these wells are installed at depths of greater than 60 mbgs. They are high-yield wells, ranging from 3,640 m^3/day at Well No. 5 and Well No. 7, to a combined 12,478 m^3/day at the twinned Well Nos. 17/18 (Golder, 2010).

The City of Barrie municipal wells have a low groundwater vulnerability score of 2 to 4, largely based on the depth to the A3 and A4 aquifers, the presence of a confining layer in many locations above the upper A2 aquifer, and in some areas, confining strata between the A3 and A4 aquifers. The A3 and A4 aquifers are in direct contact with each other under the central City of Barrie area.

Groundwater Quality

There is a lack of publicly available groundwater quality information in areas proximal to the study area. A provincial groundwater monitoring network well (W-223) is present within 500 m of the eastern terminus of the study area; however, it is located on the former Barrie Landfill site, and is slated for removal from the monitoring network by the NVCA, as it is slightly outside the Nottawasaga Valley Watershed. Historical groundwater sampling results indicated concentrations of parameters below the pertinent Ontario Drinking Water Objectives for all measured parameters except iron and manganese (NVCA, 2015).

4.6.5 Designated or Special Natural Areas

Designated or special natural areas are identified by federal or provincial agencies and municipalities through legislation, policies, or approved management plans. These areas typically have special or unique values that result in conservation land initiatives. Such areas may have a variety of ecological, recreational, and aesthetic features and functions that are highly valued. The PPS (2014) requires that municipalities and others responsible for land use planning protect PSWs.

Bear Creek Provincially Significant Wetland

As discussed in section 4.6.3, an environmentally sensitive feature, the Bear Creek PSW, was identified in the study area as well as some evaluated non-provincially significant wetland areas adjacent to Bear Creek PSW. The existing transmission right-of-way crosses these wetland areas.

The Bear Creek PSW is located in Simcoe County within the Township of Springwater and the City of Barrie. The Bear Creek PSW consists of 10 connected wetlands, primarily swamps and marshes, that cover a total area 974.1 ha. The Bear Creek PSW was classified as a PSW in 1993 by the MNRF based on the Ontario Wetland Evaluation System (OWES).

Findings from most recent wetland evaluation conducted by the MNRF (1993) under the OWES and additional information gathered thereafter are summarized below. Figure 4-6 presents a photo of the wetland.



Figure 4-6: Bear Creek Wetland

Soils that compose the Bear Creek PSW are typically hydric and inundated. Organic matter is abundant at the wetland whereby partially decomposed humic/mesic soils comprise 42% of the soil types, followed by 24% sand, 21% clay/loam, and 13% fibric.

Multiple vegetation communities exist in the Bear Creek PSW which include, by percent vegetation cover: deciduous trees (54%), coniferous trees (28%), tall shrubs (13%), narrow leaved emergent plants (2%), robust emergent plants (1.7%), low shrubs (0.5%), and herbs (0.4%).

Mammals, primarily furbearers, have been observed at the Beer Creek PSW, which include: muskrats, raccoons, beavers, minks, coyotes, and red squirrels. The wetland has also been identified to be a locally significant cover during the winter seasons for wildlife, including deer.

The cool, low-riffle characteristics of the Bear Creek that feeds into the wetland create suitable habitats for fish species that are intolerant of disturbed systems. These species

include: dace, trout (rainbow and brook), and mudminnow. The wetland is also used for fish spawning and the establishment of nursery-habitats which are locally significant.

SAR identified by MNRF may also be present at the Bear Creek PSW (see section 4.6.6).

Along with connectivity to municipal wells through groundwater recharge, the Bear Creek Wetland has been recorded to attenuate floods. The wetland acts as a carbon sink, and also has the ability to uptake pollutants due to high vegetation cover.

Recreational activities, including hunting and fishing, are also found to be of significance at the wetland. Land usages surrounding the Bear Creek PSW vary widely and include: abandoned pits, quarries, and agricultural fields (e.g., row crops and pastures).

Portions of Bear Creek which lie within the Bear Creek PSW were identified to be in ‘below potential’ or ‘impaired’ in terms of stream quality and habitat health by the NVCA (2013) due to the surrounding urban development. This includes the construction of Ferndale Drive which was built over the wetland.

The NVCA has conducted three riparian/stream bank tree planting campaigns – two along the Township of Essa, and one in the Township of Springwater, as well as one culvert removal project in the City of Barrie to aid Brook Trout spawning.

4.6.6 Natural Heritage Features

As defined in the PPS, natural heritage features and areas include “significant wetlands, significant coastal wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valleylands south and east of the Canadian Shield, significant habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest”, which are important for their environmental and social values as a legacy of the natural landscapes of an area.

The key natural heritage features that are defined in the PPS are considered below. Information on natural heritage features was collected from the following sources:

- Species at Risk Ontario (SARO);
- *Species at Risk Act* (SARA) data base;

- Natural Heritage Information Centre (NHIC) database (NHIC, 2017);
- MNRF Bear Creek PSW wetland evaluation report (1993);
- Atlas of Breeding Birds of Ontario (Cadman et al., 2007);
- Atlas of the Mammals of Ontario (Dobbyn, 1994);
- Bat Conservation International range maps (Bat Conservation International, 2016);
- Ontario's Reptile and Amphibian Atlas (Ontario Nature, 2016);
- City of Barrie Official Plan (2017);
- Township of Springwater Official Plan (1998);
- LSRCA and NVCA;
- Aerial imagery; and
- Ontario Base Map.

In addition to the background information review, Hydro One's environmental consultant, Arcadis, conducted site visits to survey the transmission line right-of-way and adjacent lands from Essa TS to Barrie TS. Field surveys were carried out from June 17, 2016 to July 10, 2017.

Vegetation has been cleared in the right-of-way to accommodate the transmission lines and structures. The present vegetation is comprised of successional communities with pioneer species. In the wetland areas, these are largely numerous willow species (*Salix* spp.) as well as poplar (*Populus* spp.), alder (*Alnus incana*) and cattail (*Typha latifolia*). In the drier areas of the right-of-way, successional vegetation communities are largely cultural meadows with grasses, native and non-native flowering plants and saplings of poplar and willow. The plant species list contained in Appendix B4 includes provincial rankings and federal status. Non-native species are identified.

Ecological communities were classified in accordance with ELC for southern Ontario (Lee et al., 1998; Lee, 2008). ELC communities were mapped based on aerial photographs and existing information and verified in the field where access was possible (see Appendix C4).

The following vegetation communities in the study area were identified during the site visits:

- Aggregate (AGG) – Two areas in the right-of-way are used for the extraction of aggregate along Pinegrove Road near Essa TS. Access was restricted in the quarry area during field surveys.
- Agricultural Field (AG) – Agricultural fields are found throughout the study area. They are actively managed and are either hay fields or planted crops, such as soybean and corn.
- Cattail Mineral Shallow Marsh-MAS2-1/ Narrow-leaved Sedge Mineral Shallow Marsh- MAS2-3/ Willow Mineral Thicket Swamp (SWT2-2) - In the transmission line right-of-way where trees have been removed over the years, wetlands have developed into a mix of mature willow thicket swamps, cattail marshes and sedge marshes. Standing water can be found in a number of areas, in particular where cattails (*Typha latifolia* and *T. angustifolia*) are present. Willows (*Salix* spp.) as well as sedges (*Carex* spp.) and rushes (*Juncus* spp., *Scirpus* spp.) are present throughout the wetland areas. Mitigation measures are required to protect the wetland areas during project activities and are discussed in section 7.
- Cultural Meadow, Dry-Moist Old Field Meadow (CUM1-1) – Cultural meadows are present in the right-of-way outside of wetland and agricultural areas and they are subject to continuous disturbance by people using the right-of-way for dog-walking, running, snowmobiling and driving all-terrain vehicles (ATVs). Species present in the cultural meadows consisted of a mix of non-native (i.e., introduced) and native species, including staghorn sumac (*Rhus typhina*), willow (*Salix* spp.), cottonwood (*Populus deltoides*) saplings, grey dogwood, goldenrod (*Solidago canadensis*), grasses (*Poa* spp.), Queen Anne’s lace (*Daucus carota*), white sweet clover (*Melilotus alba*), bird’s foot trefoil (*Lotus corniculatus*), riverbank grape (*Vitis riparia*), butter-and-eggs (*Linaria vulgaris*), dandelion (*Taraxacum officinale*) and curled dock (*Rumex crispus*).
- Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1) - The woodlot adjacent to Barrie TS consists largely of maple with a few pines on the north side. The woodlot has been subject to extensive disturbance in the past. Species present include sugar maple (*Acer saccharum*) with spars understory of sensitive fern (*Onoclea sensibilis*) and grasses (*Poa* spp.). Honeysuckle (*Lonicera tatarica*) and grey dogwood (*Cornus racemosa*) is present at the woodlot edge.

- Mineral Cultural Thicket (CUT1) – Cultural thickets dominated by sumac and cedars are present near Essa TS and on the west side of the quarry, adjacent to the cultural meadow.
- Mixed Forest (FOM) – Fragments of mixed and deciduous forest are present within the study area adjacent to Barrie TS. Species include sugar maple, ash (*Fraxinus pennsylvanica*), buckthorn (*Rhamnus cathartica*) and grey dogwood.
- Open Aquatic (OAO) - A pond is present along the right-of-way. It appears to be more than 2 m deep and aquatic vegetation was not observed (Figure 4-7).
- Red Pine Coniferous Plantation (CUP3-1) – Two red pine (*Pinus resinosa*) plantations are present adjacent to Barrie TS and Essa TS, they are both located outside the perimeter fence. Planted and landscaped areas are present inside the property of both Essa TS and Barrie TS.
- Urban (U) – Urban areas are present in and adjacent to the right-of-way, in particular closer to Barrie TS. A number of residences and businesses are within 100 m on either side of the transmission lines.

Breeding bird surveys were carried out from June 17 to July 14, 2016. All birds seen or heard during site visits were recorded. The survey was carried in accordance with the Atlas of the Breeding Birds in Ontario protocols (Cadman et al., 2007) and consisted of five minute long Point Counts. A list of breeding birds heard and/or observed is shown in Appendix B4. Species significance was evaluated based on federal and provincial level published literature and current status lists.



Figure 4-7: Open Water Area within Bear Creek Wetland

Wetlands

The existing transmission line crosses Bear Creek PSW described in section 4.6.5 as well as a number of evaluated non-provincially significant wetland areas adjacent to Bear Creek PSW.

Wetlands observed during field surveys were investigated and classified using the ELC system for southern Ontario and are described above (Lee et al., 1998; Lee, 2008). Detailed ELC and natural heritage mapping are provided in Appendix C. Wetland types identified in the study area were open water, shallow marsh, thicket swamp, and mixed swamp.

Fish Habitat

Bear Creek and two tributaries meander across the study area with sandy and small gravel substrates. Riparian vegetation consists of grasses and willow in the right-of-way, and deciduous and coniferous trees throughout the swamps on either side of the right-of-way. An aquatic habitat assessment found that Bear Creek and the two tributaries that feed into the wetland provide suitable habitats for a number of fish species that are intolerant of disturbed systems. These species include: dace, rainbow trout and brook trout and mudminnow according to the wetland evaluation report. The watercourses are also suitable

for fish spawning and are used for the establishment of nursery-habitats which are locally significant.

Woodlands

Woodlands are treed areas, woodlots and forested areas that provide various environmental and economic benefits to landowners and the general public (PPS, 2014). During the field surveys, plant communities were broadly characterized and key natural features were noted. A number of woodland areas were identified in the study area during these surveys and through desktop ELC mapping.

Because of the nature of the right-of-way (i.e., successional vegetation communities after clearing), there are no woodlands present within the right-of-way. The woodlands on either side of the right-of-way consist largely of treed swamps (also considered as wetlands), and some mixed and some deciduous forest. In the Bear Creek Wetland swamps, the dominant vegetation is deciduous trees (54%), coniferous trees (28%) and shrubs (14%). Other woodlots adjacent to the right-of-way are dominated by deciduous trees with some conifers present. Adjacent to both Essa TS and Barrie TS, stands of planted red pine (*Pinus resinosa*) are present.

Significant woodlands are woodlands that are ecologically, functionally and/or economically important based on one or more features, such as species composition, stand age, contribution to the broader landscape, site quality, or past management history (MNRF, 2010). The designation of significant woodlands is deferred to local planning authorities. General guidelines for determining significance of a woodland area are also included in the Natural Heritage Reference Manual for Policy 2.3 of the PPS (MNR, 2010) if the local planning authorities have not provided criteria for significance.

The City of Barrie Official Plan (2017) does not define significant woodlands as a standalone category, but rather defines Levels 1 to 4 for Natural Heritage features in Schedule H (provided in Appendix C2). Level 1 resources are identified as critical components of the Natural Heritage Resource network within the City, which include PSWs, non-PSWs greater than 0.5 hectares (Ha), and woodlands greater than 10 Ha, significant habitat of endangered and threatened species, watercourses, vegetation protection zones, linkages and areas identified as environmental protection. Level 2 resources are considered significant

components of the Natural Heritage Resource network and include, amongst others, ANSIs, significant wildlife habitat, watercourses and woodlots with an area of 4 to 10 Ha. Level 3 resources are significant and supporting components of the Natural Heritage Resource network and include regional ANSIs, woodlands with an area of more than 0.5 Ha, but smaller than 4 Ha, woodlands within 30 m of Level 1 or Level 2 features, cultural thickets and meadows as part of natural woodlands and linkages.

Within the City of Barrie Level 1, and Level 3 features have been identified adjacent to the right-of-way, including between Miller Drive and Dunlop Street, Dunlop Street West to Ferndale Drive and the woodlot adjacent to Barrie TS.

The Township of Springwater Official Plan Schedule B identifies two natural heritage features for Environmental Protection, the woodlot between Grenfel Road and Pinegrove Road, which is shown as woodlot larger than 30 Ha in size and the swamp wetland area between Grenfel Road and the township boundary to the east which is designated Environmental Protection Category 2 Lands delineated as Natural Heritage (Environmental Protection). As defined in Section 16 of the Official Plan, Category 2 Lands include, amongst others, those environmentally significant lands and/or waters of ecological sensitivity, e.g., lands situated adjacent to provincially and locally significant wetlands and other Natural Heritage Environmental Protection Category 1 Lands; significant wildlife habitat; woodlots; corridors or other linkages between core areas of the Natural Heritage System; groundwater recharge and discharge, aquifer, and shoreline areas; and fish habitats.

Valleylands

Valleylands are natural areas that occur in a valley or other landform depression in which water flows or stands for part of the year (PPS, 2014). Significant valleylands are valleylands that are “ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system” (MNR, 2010).

Valleylands were not identified in the study area. Bear Creek and the tributaries do not have distinct valleylands associated with them; they flow through the wetlands in the right-of-way and swamps with a bank height of between 0.2 to 0.5 m.

Species at Risk

The *Endangered Species Act, 2007* prohibits the killing, harming or harassing of species identified as ‘endangered’ or ‘threatened’ in the schedules to the Act. General habitat protection is provided by the *Endangered Species Act, 2007* to all threatened and endangered species. Subsection 10(1) (a) of the *Endangered Species Act, 2007* states that “No person shall damage or destroy the habitat of a species that is listed on the SARO List as an endangered or threatened species”. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law under the *Endangered Species Act, 2007*.

Based on information retrieved from the NHIC (2017) database, the MNRF, and from field investigations, Table 4-2 provides a list of SAR that have been identified as having the potential to occur in the study area. A detailed SAR screening was completed and is presented in Appendix B5.

One SAR, Bobolink (*Dolichonyx oryzivorus*), was identified within the study area during field investigations. Bobolink is listed as threatened provincially by the Committee on the Status of Species at Risk in Ontario (COSSARO) and federally by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Bobolink was observed during the breeding bird survey on June 21, 2016 and July 11, 2016 in a cultural meadow within the right-of-way (Figure 4-8).



Figure 4-8: Bobolink in a Cultural Meadow

Table 4-2: Species at Risk with Potential to Occur within the Study Area

Common Name	Scientific Name	SARA ¹	Endangered Species Act, 2007 ¹	Srank ²
Plants				
Forked Three-awned Grass	<i>Aristida basiramea</i>	END	END	S2
Spotted Wintergreen	<i>Chimaphila maculata</i>	END	END	S1
Hill's Thistle	<i>Cirsium hillii</i>	THR	THR	S3
Eastern Prairie Fringed Orchid	<i>Platanthera leucophaea</i>	END	END	S2
Insects				
Rusty-patched Bumble Bee	<i>Bombus affinis</i>	END	END	S1
Hine's Emerald	<i>Somatochlora hineana</i>	--	END	S1
Fish				
Lake Sturgeon	<i>Acipenser fulvescens</i>	--	THR	S3
Reptiles				
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	THR	S3
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	THR	THR	S3
Massasauga	<i>Sistrurus catenatus</i>	--	THR	S3
Birds				
Henslow's Sparrow	<i>Ammodramus henslowii</i>	END	END	SHB
Eastern Whip-poor-will	<i>Antrostomas vociferus</i>	THR	THR	S4B
Piping Plover	<i>Charadrius melodus</i>	END	END	S1B
Cerulean Warbler	<i>Dendroica cerulea</i>	SC	THR	S3B
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	S4B
Barn Swallow	<i>Hirundo rustica</i>	--	THR	S4B
Least Bittern	<i>Ixobrychus exilis</i>	THR	THR	S4B
Loggerhead Shrike	<i>Lanius ludovicianus</i>	--	THR	S4B
King Rail	<i>Rallus elegans</i>	END	END	S2B
Eastern Meadowlark	<i>Sturnella magna</i>	--	THR	S4B

Notes:

¹ Federal SARA, 2002/Provincial Endangered Species Act, 2007: END – endangered, THR – threatened, SC - special concern; ²Provincial Conservation Ranking (Srank): S1 - Critically imperilled, S2 – Imperilled, S3 – Vulnerable, S4 - Apparently secure, SH - possibly extirpated/historic; B – Breeding.

Wildlife and Significant Habitat

The presence of significant wildlife habitat was assessed according to the Significant Wildlife Habitat Technical Guide (MNR, 2000) and the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015). Habitat types considered include: seasonal concentration areas of animals; rare vegetation communities or specialized habitat for wildlife; habitat for species of conservation concern; and animal movement corridors. Common large and small mammals in the study area include: white-tailed deer (*Odocoileus*

virginianus), grey squirrel (*Sciurus carolinensis*), Eastern chipmunk (*Tamias striatus*), Eastern cottontail (*Sylvilagus floridanus*), and raccoon (*Procyon lotor*). Other wildlife present are numerous species of birds, reptiles, amphibians, fish and Lepidoptera (e.g., moths and butterflies).

Seasonal Concentration Areas of Animals

Seasonal concentration areas of animals are considered to be areas where large numbers of a species gather together at one time of the year, or where several species congregate on an annual basis, such as deer yards; amphibian breeding ponds; snake and bat hibernacula; waterfowl staging and moulting areas; raptor nesting habitat; bird nesting colonies; shorebird staging areas; and passerine migration concentration areas.

The right-of-way and adjacent lands (e.g., Bear Creek PSW and woodlots) provide breeding habitat for amphibians, marsh, shrub/early successional and woodland breeding birds, species of concern and rare wildlife species. They provide winter cover for wildlife (e.g., deer) and areas for waterfowl staging and molting and waterfowl breeding.

Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare vegetation communities are vegetation communities that are considered rare in the province. Generally, communities assigned a provincial conservation rank of S1 to S3 (extremely rare to rare-uncommon) by the NHIC could qualify. Based on desktop review and the field surveys, it was determined that no vegetation community ranked S1 to S3 is within the study area. All of the natural vegetation communities are ranked S4 or S5, or common and widespread provincially. Therefore, no further assessment is warranted.

Specialized habitat for wildlife is habitat that provides a critical resource for a group of wildlife. Examples include waterfowl nesting areas, turtle nesting areas and raptor nesting habitat. Three specialized habitats for wildlife were identified within the natural heritage study area: amphibian breeding habitat (woodland), amphibian breeding habitat (wetland) and waterfowl nesting areas. These habitats are discussed further below.

Amphibian breeding habitat (woodland and wetland) was identified within the study area. All amphibians seen or heard during site visits were recorded. Amphibian surveys were carried

out in 2017 in accordance with the protocol in Bird Studies Canada (2009) Marsh Monitoring Program. A number of species were heard during the amphibian surveys, including spring peeper (*Pseudacris crucifer*), grey tree frog (*Hyla versicolor*) and American toad (*Bufo americanus*). A list of amphibians observed is shown in Appendix B4.

The Bear Creek PSW evaluation noted waterfowl nesting areas in the wetland. Site visits confirmed that nesting habitat is present in the wetland areas in the right-of-way, which includes cattail marshes, meadows and areas with willow and alder cover.

Habitat for Species of Conservation Concern

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015) defines five habitats of species of conservation concern that may be considered significant wildlife habitat:

- Marsh bird breeding habitat;
- Open country bird breeding habitat;
- Shrub/early successional bird breeding habitat;
- Terrestrial crayfish habitat; and
- Special concern and rare wildlife species habitat.

Indicator species for marsh bird breeding habitat and open country bird breeding habitat listed in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E were not identified in the study area; however, extensive marsh and agricultural habitat is present throughout the right-of-way and adjacent lands. In addition, large areas of cultural meadows are present which may provide habitat for open country birds.

One indicator species for shrub/early successional bird breeding habitat, brown thrasher (*Toxostoma rufum*), was identified in the natural heritage study area.

Terrestrial crayfish were not observed incidentally in the natural heritage study area; however, potentially suitable marsh and swamp habitat is present.

Animal Movement Corridors

The Significant Wildlife Habitat Technical Guide (MNR, 2000) defines animal movement corridors as elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. To qualify as significant wildlife habitat, these corridors need to be a critical link between habitats that are regularly used by wildlife.

The right-of-way functions as a corridor for animal movement and linkage between natural heritage features (e.g., wetlands or woodlots) on either side of the right-of-way. It provides the opportunity for wildlife to move freely along or across the right-of-way and the vegetation provides shelter, protection from predation and food sources. There is little disturbance in the areas outside the urban boundary of the City of Barrie, and the right-of-way vegetation is fully integrated in the landscape. The section of right-of-way in the urban areas of the City of Barrie also provides linkage and corridor, mainly between smaller natural environment features; however, the right-of-way is intersected by numerous major roads with extensive traffic, such as Ferndale Road, Miller Drive and Dunlop Street West.

Non-Native and Invasive Species

Cultural vegetation communities have been anthropogenically disturbed and contain a large non-native component and they do not have conservation rankings. Cultural communities in the right-of-way consist mainly of cultural meadows, and due to past disturbance from clearing, have large numbers of non-native species. The cultural meadow communities appear to be stable despite consisting of a large non-native plant component. Large areas of truly invasive species, such as common reed (*Phragmites australis* spp. *australis*), Japanese knotweed (*Fallopia japonica*), dog strangling vine (*Cynanchum rossicum*) or garlic mustard (*Alliaria petiolate*), were not recorded.

Significant Areas of Natural and Scientific Interest

ANSIs are designated by the MNRF based on the presence of unique natural landscapes or existing features that meet specific criteria as having life or earth science values related to protection, scientific study or education. No ANSIs were identified within the study area (MNRF, 2017c).

4.7 Recreational Resources

Within the proposed Project study area there are snowmobiling trails and informal trails which may be used for recreational activities, such as dog-walking, running, snowmobiling and driving ATVs. Recreational activities, including hunting and fishing, have also been known to occur within the wetland. Featherwind Golf Course and Duffer's Golf Centre are located south of the transmission right-of-way between Grenfel Road George Johnson Road in the Township of Springwater. The Barrie Gun Club organization is located adjacent to the transmission line right-of-way east of Pinegrove Road.

4.8 Visual and Aesthetic Resources

This factor considers the physical appearances of different landscapes and their susceptibility to change due to the imposition of transmission facilities.

A visual assessment was completed based on a combination of desktop evaluation and field data collection. The visual assessment was conducted in four representative areas within the study area. The proposed Project will be located within the existing transmission line right-of-way and existing Hydro One owned properties. The existing transmission right-of-way crosses a mix of farmland, forested areas and industrial lands containing transmission line infrastructure.

Hydro One retained 4DM to conduct visual simulations of the proposed Project. Visual simulations were completed for the proposed new 230 kV steel structures; the appearance of Essa TS and Barrie TS will not be significantly different after the proposed upgrades are complete. Structure locations were determined relative to a proposed structure location dataset provided by Hydro One and heights were approximated. The exact location of each structure, structure type and height will be determined in the detailed design phase of the project, after the Class EA is filed. Base photographs were taken at select locations that would capture the landscape character of the four areas and to show the existing right-of-way. These locations were recorded and cameras were set as closely as possible in the digital model to replicate the photographs' scale and perspective. The resulting simulations were conducted to provide an example of potential structure type and location at each of the four representative locations relative to the existing surrounding landscape. The resulting

simulations of the visual assessment and the potential effects to the existing visual and aesthetic environment of the study area are discussed in section 7.8.

5 Alternative Methods

As previously described in section 1.3, alternatives to meet the need of the undertaking were evaluated during the development of the Barrie/Innisfil IRRP and a preferred transmission alternative was chosen. Several transmission alternatives were also considered in the IRRP are discussed below.

Alternative Method 1 – Like-for-Like Replacement

An alternative method to replace the existing 115 kV line, and station equipment which are reaching their end of life with like-for-like equipment (i.e., maintaining its voltage at 115 kV) was considered. This option would not address the forecasted growth and future capacity needs of the area. To meet the additional capacity needed to supply growth would then require development of new, greenfield TS site(s) and right-of-ways. Construction of new transmission infrastructure would involve:

- Acquisition of land rights for new TS site(s) and right-of-ways;
- Vegetation clearing at the new sites and along the new right-of-ways;
- Installation of new access routes;
- Construction of new structures; and
- Stringing of new conductors.

The PPS (2014) states that, “before consideration is given to developing new infrastructure and public service facilities:

- The use of existing infrastructure and public service facilities should be optimized; and
- Opportunities for adaptive re-use should be considered, wherever feasible.”

This alternative method is not consistent with the recommendations of the PPS to re-use existing infrastructure and facilities. Construction of new station site(s) and a new transmission line would have more adverse effects on the environment, and would be considerably more expensive and time-consuming. Additional maintenance requirements would be necessary to keep additional station(s) and transmission lines in service, such as clearing vegetation and inspecting the lines.

Alternative Method 2 – Decommission Barrie TS

An alternative to decommission the Barrie TS site and build a new 230/44kV DESN station at Essa TS was considered; however, this option would limit future expansion of the 230 kV to accommodate future capacity increases in the area.

Alternative Method 3 – Upgrades to Existing Transmission Stations and Lines

The preferred alternative method was determined to be upgrading the E3B and E4B circuits, and Barrie TS from 115 kV to 230 kV, upgrading the transformers at Barrie TS from 55/92 mega volt ampere (MVA) units to 75/125 MVA units and retiring the two 230/115 kV auto-transformers at Essa TS. Upgrading existing transmission infrastructure is consistent with the PPS. It would involve replacing aging equipment which is nearing its end of life and satisfying the additional capacity required to meet the region's forecasted increase in electricity demand by upgrading the existing infrastructure. It would accomplish this at the lowest cost, while minimizing environmental and socio-economic effects as it fully utilizes Hydro One's existing assets and mitigates reliability risks.

Upgrading the existing 115 kV circuits (E3B and E4B) requires the installation of taller structures in order to maintain safe ground clearances. In order to reduce the footprint of the infrastructure and be able to maintain an electricity supply during construction (without constructing a new bypass transmission line), it was determined that the preferred option would be to construct a double-circuit 230 kV transmission line in place of one of the existing 115 kV transmission lines (circuit E3B) and to upgrade it to taller, steel structures while the other 115 kV line (circuit E4B) remains energized for the duration of construction and is removed following in-service of the 230 kV double-circuit transmission line. A detailed description of the project is provided in section 6.

6 Project Description

The proposed Project is similar to many other projects completed by Hydro One. The proposed Project consists of the following major components:

- Remove the existing southern wood pole 115 kV transmission line (circuit E3B) between Essa TS and Barrie TS (a distance of approximately 9 km);
- Construct new steel structures within the existing E3B and E4B right-of-way following the centreline of circuit E3B;
- The northern transmission line (circuit E4B) will remain in-service to supply electricity from Essa TS to Barrie TS during construction;
- String new 230 kV transmission conductors (wires) and shield wire on the new steel structures;
- Rebuild Barrie TS from a 115 kV station to a 230 kV station;
- Remove existing 115 kV equipment and install new 230 kV equipment at Essa TS;
- Energize the new 230 kV transmission line; and
- Remove the existing E4B wood pole 115 kV transmission line between Essa TS and Barrie TS.

Rebuilding and upgrading Barrie TS from a 115 kV to a 230 kV station and replacing end-of-life equipment would involve expansion of the west fenceline by approximately 20 m within Hydro One owned property (see Figure 6-1). The exact extent of the fenceline expansion would be determined during the design phase.

End-of-life equipment replacement at Essa TS would occur within the existing station fenceline. All 115 kV infrastructure would be removed, which includes auto-transformers, breakers, structures, and associated equipment. New 230 kV equipment would be installed in the existing 230 kV switchyard to accommodate the new circuits to Barrie TS. Buildings within Essa TS may require replacement.

The proposed upgraded 230 kV design is more compact than the existing infrastructure since both circuits would be mounted on the same structures instead of separate, side-by-side structures for each circuit along the corridor from Essa TS to Barrie TS. As a result, the width of the right-of-way shared by both circuits, E3B and E4B, would be reduced from

approximately 50 metres to 34 metres, minimizing the footprint required for the transmission line. Figure 6-2 depicts the structures of the two existing 115 kV wood pole transmission lines and an example of a steel structure for the proposed new 230 kV double-circuit transmission line. Structure type for the new transmission line would be determined during the design phase. Examples of different types of steel structures used by Hydro One are provided in Figure 6-3. In order to maintain a safe clearance between the transmission lines and the ground, the new structures will be between 40 and 45 m in height, compared to the existing structures which are approximately 15 to 20 m in height.

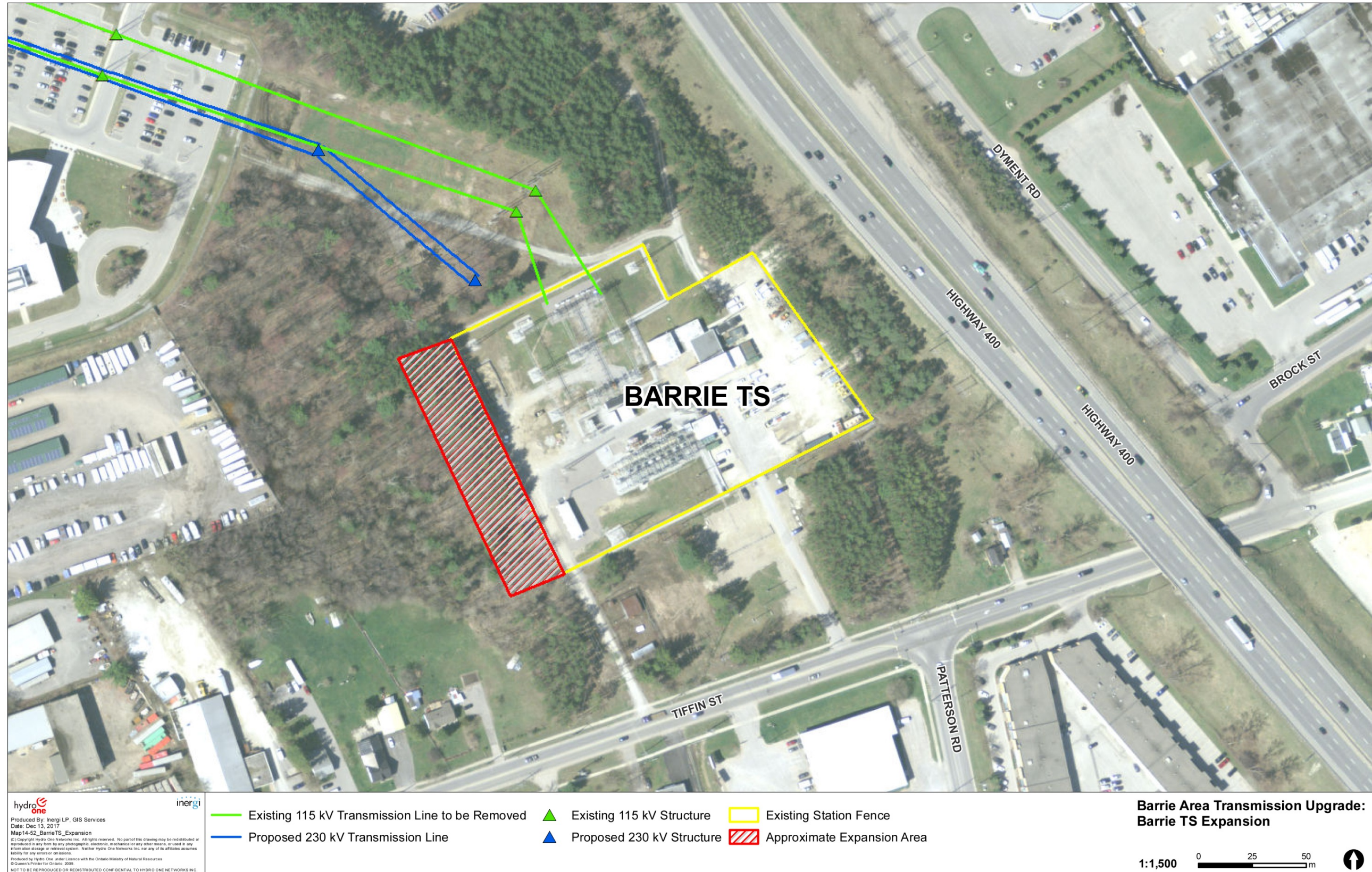


Figure 6-1: Approximate Barrie TS Expansion

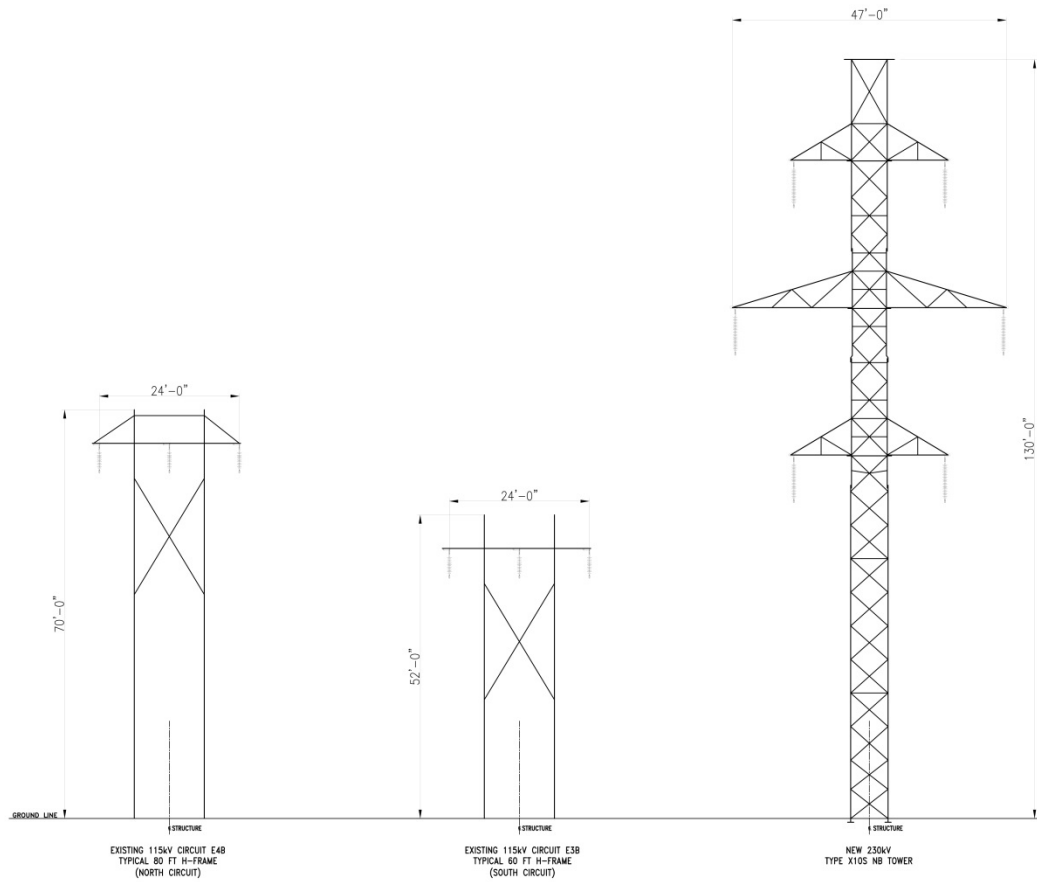


Figure 6-2: Existing Structures vs. Proposed Structures

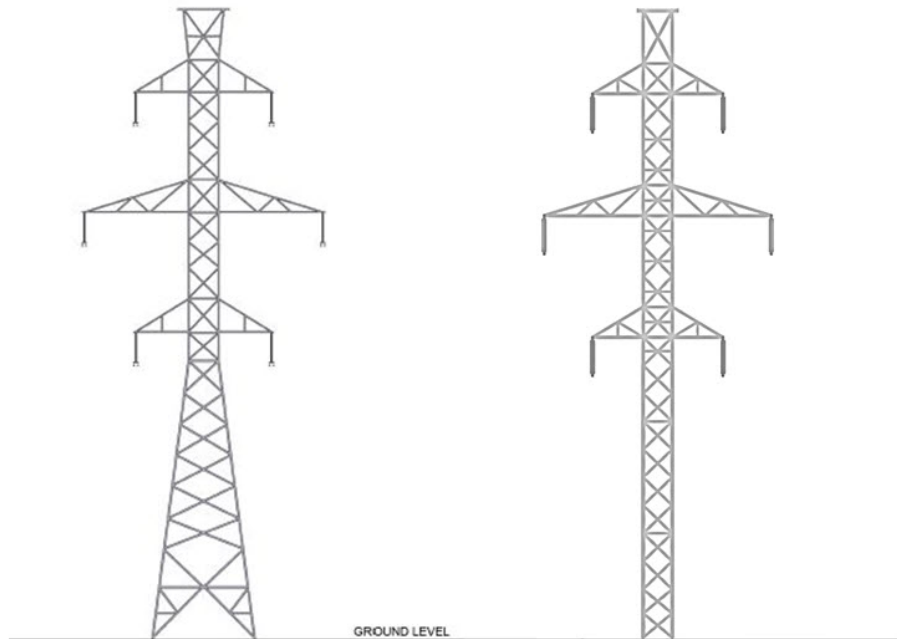


Figure 6-3: Examples of Typical Hydro One Steel Structures

6.1 Design Phase

Following completion of the Class EA process, detailed engineering and design for the proposed Project will be undertaken. The final design plans will be based on necessary surveys and consultation, including a geotechnical survey and slope stability assessment. Concurrent with finalization of the design, required permits, licences and approvals, as listed in section 1.4.3, will be obtained. Hydro One will also finalize restoration plans in consultation with the appropriate stakeholders and local community, as necessary.

An Environmental Specification (also known as an Environmental Management Plan) document will be prepared following the completion of the Class EA process that will provide specific directions to construction personnel, summarizing legislated requirements and environmental commitments set out in the final ESR. This will include all required monitoring, as specified in the monitoring plan (section 8).

6.2 Construction Phase

Construction activities will be guided by Hydro One standards and guidelines as well as project-specific documents; these are to be adhered to by all construction personnel including contractors and sub-contractors. In addition, the project-specific Environmental Specification, outlining specific requirements for the proposed Project, will be followed during the construction phase.

Prior to construction, a detailed construction plan will be developed. Construction activities will be restricted to designated work areas and protective barriers, such as fencing, will be erected to protect adjacent features from construction related effects.

Throughout the construction period, an Environmental Specialist will be available to address unforeseen environmental effects and mitigation requirements. The Environmental Specialist will monitor activities to ensure conformance with the requirements set out in the Environmental Specification that will be prepared for the project.

Upon completion of construction, clean up and restoration (e.g., seeding) of areas disturbed by construction will occur, as required. As well, operation and maintenance staff will be

provided with a briefing and “as constructed” documentation covering ongoing commitments, including monitoring and notification requirements, if applicable.

6.2.1 Transmission Line Construction Work

Construction of the transmission line will involve the following activities:

- Establishment of construction access route to each structure location;
- Site preparation, including the removal of vegetation within the construction work area, and the installation of access roads and laydown areas on the right-of-way, as required, which will consist of crushed stone overlain on geotextile liner;
- Construction of watercourse crossings, as required;
- Installation of required environmental mitigation measures (e.g., silt fence/socks and erosion blankets);
- Temporary closure of existing roads and trails during construction, where required;
- Mobilizing equipment and installation of foundations at the new structure locations;
- Discharge of construction water from dewatering activities to filter bags and ground surface (i.e., a vegetated area) before it reaches nearby watercourses, or to the existing sewer network;
- Installation of temporary wood poles known as “rider poles” at road crossings as a safety barrier when relocating and stringing new transmission lines;
- Dismantling and removal of the existing wood pole structures (circuit E3B);
- Construction and erection of steel structures;
- Stringing the new transmission conductors (wires) on the new steel structures;
- Energizing new circuit;
- Dismantling and removal of the existing wood pole structures (circuit E4B), and removal of access roads and laydown areas, as required; and
- Clean-up and restorations.

6.2.2 Transformer Station Construction Work

Construction at Essa TS and Barrie TS will involve the following activities:

- Site preparation at Barrie TS, including clearing and grading;
- Installation of perimeter fence around station construction areas;

- Removal of end-of-life equipment from both stations;
- Delivery and installation of transformers; switching equipment; protection, control and telecommunications equipment, etc.;
- Installation of station underground services and drainage facilities;
- Installation of foundations and steel support structures;
- Installation of building(s) for station protection, control, telecommunications and station services;
- Installation of overhead rigid bus, insulators and associated electrical connectors;
- Installation of ground grid and lightning protection masts, where required; and
- Clean-up and site restorations.

6.3 Maintenance, Operation and Retirement

The proposed Project is scheduled to be in service by winter 2020 and will operate for the foreseeable future. The transmission line and right-of-way will undergo regular maintenance in adherence with Hydro One’s maintenance standards and regulatory requirements to maintain a safe and reliable electricity transmission system. Should the transmission facilities become obsolete or unserviceable, the equipment will be retired from service in accordance with the applicable standards and legislation of that time. The facilities may be removed, at which point the site could be made suitable for another purpose.

6.4 Project Schedule

The anticipated schedule for proposed Project activities is provided below in Table 6-1. This schedule shows key steps remaining in the Class EA process and subsequent anticipated timing of the start of construction and commissioning of the transmission line upgrade.

Table 6-1: Project Schedule

ACTIVITY	PERIOD
Release of draft ESR and start of review period	January 2018
Comment integration and response	February 2018
Filing of final ESR with the MOECC	March 2018
Construction start	Spring 2019
Planned in-service date	Winter 2020

7 Potential Environmental Effects and Mitigation Measures

This section describes the potential environmental effects and mitigation measures associated with both the short-term (construction) and long-term (operation) activities of the proposed Project. The assessment of potential environmental effects for the proposed Project considered the baseline information on the environmental features that was collected for the study area as presented in section 4. If resources were determined not present in the study area during the collection of the baseline information, they were not included in this section.

The potential environmental effects resulting from the construction and operation of the proposed Project are similar to other projects undertaken by Hydro One and are well understood. Hydro One has a strong track record of environmental compliance and stewardship and is committed to the completion of comprehensive environmental and social analysis and mitigation of potential environmental effects.

The following sections describe potential environmental effects for both the short-term (construction) and long-term (operation) activities of the proposed Project. The selection of mitigation measures are based on the following seven principles:

- Avoidance of sensitive areas, where practical;
- Avoidance of watercourse crossings, where feasible, by use of an existing nearby crossing, access to structures from either side of the watercourse, or use of off-corridor access;
- Appropriate timing of construction activities, where feasible, to avoid sensitive time periods, such as fish spawning and egg incubation periods, or migratory bird nesting periods;
- Proactive communication with area residents and businesses on proposed Project timelines and construction areas;
- Proactive communication with First Nation and Métis communities, government agencies, stakeholders and interest groups regarding the proposed Project;

- Implementation of conventional, proven mitigation measures during construction consistent with the criteria set out in Appendix E of the Class EA document (Hydro One, 2016), and in accordance with applicable legislative requirements; and,
- Development of environmental enhancement or compensation measures to offset the unavoidable effects of construction and operation where such effects exist and where practical.

Based on the project design and implementation of the proposed mitigation measures, no significant adverse or residual effects (i.e., effects following the implementation of mitigation) are expected.

7.1 Agricultural Resources

A portion of the transmission right-of-way is located on land used for agriculture. Having construction equipment cross through farms may be disruptive to farm operations. Temporary crop loss will occur during the construction period where access roads are required and construction areas are needed around structure locations.

The mitigation measures that will be put in place to minimize potential effects of the transmission line on agriculture and soils are as follows:

- Access roads will be built using geotextile and crushed rock and will be removed in agricultural lands after construction is complete;
- Compensation will be paid to the property owner for damages to crops, tile drainage, farm equipment and livestock;
- Structure location and access road lay-out will be discussed with property owner prior to location finalization to minimize disruption and damage; and
- Contact will be maintained with land owners/tenants regarding work schedule, fencing, gates, noise, tiles and remediation measures.

Hydro One will make all efforts to design the transmission structures in order to minimize the footprint of the structures and to maximize the available land for agricultural use.

7.2 Forestry Resources

As indicated in section 4.2, there is no potential for the proposed Project to affect forestry resources; therefore, no potential effects have been identified for the proposed Project.

7.3 Archaeological and Cultural Heritage Resources

As discussed in section 4.3, a Built Heritage Resource Background Review (AECOM, 2016) was conducted which followed the process for Identification of Cultural Heritage Resources outlined in the Standards and Guidelines for Conservation of Provincial Heritage Properties (MTCS, 2010). As per the conclusions of the Built Heritage Resource Background Review, no effects to Built Heritage Resources or Cultural Heritage Resources are anticipated as a result of the proposed Project (AECOM, 2016).

The Stage 2 archaeological assessment did not result in the identification of any archaeological materials; therefore, this area is considered free of archaeological concern (AECOM, 2017b). The final report for the Stage 2 archaeological assessment was submitted to the MTCS on November 13, 2017 and on March 6, 2018 the MTCS confirmed it had been entered into the Ontario Public Register of Archaeological Reports (see Appendix B2).

If archaeological material is encountered during the course of the project, all activities with the potential to affect the archaeological material would cease immediately and a licensed archaeologist would be engaged, as well as the MTCS. In the event that human remains are encountered, Hydro One would immediately stop work in the area and notify the police, the coroner's office, MTCS and the Registrar of Cemeteries.

7.4 Human Settlements

As indicated in section 4.4, the study area is adjacent to agricultural, residential and environmental protection zones in the portion of the proposed Project within the Township of Springwater and adjacent to residential neighbourhoods, commercial uses, and industrial uses in the City of Barrie. Both the Official Plans for the Township of Springwater (1998) and City of Barrie (2017) specify that existing infrastructure shall be used, expanded and/or upgraded before developing new infrastructure. The proposed Project will be consistent with this policy.

Construction sites pose potential safety hazards to local land users and residents due to the operation of heavy construction equipment, if not appropriately controlled. Workplace safety and public safety are leading priorities at Hydro One. Hydro One mitigates safety issues by implementing safety measures in accordance with its Public Safety Policy and Ministry of Labour requirements during construction. This includes ensuring that the replacement and installation procedures are executed in accordance with applicable codes and regulations.

To minimize the effects of construction on public safety, Hydro One and contractors will undertake a wide range of safety measures, such as:

- Installing fencing to construction laydown areas with appropriate signage to prevent unauthorized access, as required;
- Consulting with the Township of Springwater and City of Barrie regarding the construction schedule;
- Providing construction notifications to emergency and protective services; and
- Informing adjacent residents, landowners, and businesses of the proposed project activities prior to construction. Barriers will also be used to maintain public safety and prevent unauthorized access to work areas.

During construction of the proposed Project, local residents residing in the dwellings adjacent to the right-of-way and local industrial and commercial facilities, may experience some temporary localized nuisance effects. Nuisance effects are subjective, and the magnitude of the effect will vary depending on the individual and their location in relation to construction activities. Noticeable nuisance effects relating to air quality, noise, vibration, and mud could occur intermittently during the construction phase of the project.

Air Quality

Construction activities have the potential to create temporary, localized effects on air quality in the immediate vicinity of the proposed Project (effects on air quality and associated mitigation are discussed further in section 7.6.2). Emissions from construction are primarily comprised of fugitive dust and combustion products from the movement and operation of

construction equipment and vehicles. These emissions, in turn, may create a nuisance or disturbance effect for local residents and land users during the construction phase.

Mitigation measures to reduce potential nuisance effects of dust and air emissions include:

- Maintaining equipment used on-site to minimize exhaust;
- Adhering to Hydro One's Fleet Environmental Program (anti-idling requirements and global positioning system [GPS] installation in vehicles to optimize routing); and
- Utilizing effective dust suppression techniques, such as on-site watering and road cleaning, as necessary.

Emissions from maintenance activities during operation will be variable, are expected to be short in duration, and will occur periodically over the life of the proposed Project. Nuisance effects posed by these brief activities are expected to be negligible and will not result in noticeable or long-term changes to local air quality.

Noise

The proposed Project activities have the potential to affect ambient noise levels during the construction phase. These effects, in turn, may create a temporary nuisance or disturbance effect for local residents and land users.

Noise effects will generally not be constant across the study area for the entirety of the construction phase. They will be introduced and diminished depending on where construction is actively occurring, thereby reducing the duration of nuisance effects to local residents, business operators and land users. Mitigation measures to reduce potential nuisance effects resulting from noise include:

- Maintaining equipment such that construction and maintenance activities conform to typical noise parameters;
- Considering noise when deciding on equipment, construction work methods and schedule; and
- Taking reasonable measures to control construction-related noise near residential areas.

Construction activities will conform to the Township of Springwater and City of Barrie noise by-laws to the extent feasible. If exemptions to the by law are necessary, Hydro One and contractors will obtain the applicable approvals. If construction activities need to be extended to facilitate their completion, Hydro One will inform local residents and businesses.

Vibration

The proposed Project activities have the potential to affect ambient vibration levels during the construction phase, causing nuisance and disturbance effects to local residents and land users in the vicinity of the proposed Project.

Mitigation measures to reduce potential nuisance effects resulting from vibration include:

- Considering vibration when selecting equipment, construction work methods, and schedule; and,
- Taking reasonable measures to control vibration related to project construction near residential areas.

Any construction vibration will be temporary in nature, occur only during specific activities, and limited to the immediate vicinity of the construction work area. The range in the increased vibration levels associated with construction activities will depend primarily on the number and type of sources and their proximity to the points of reception.

Mud

Construction activities may result in the accumulation of mud in construction areas. Mud mats will be installed, as required, near site exits to loosen and shake off mud. Mud related to construction activities will be removed from access roads, and vehicles and equipment will be washed and maintained at work areas as necessary. Formal cleanup and site restoration (e.g., grass seeding), if necessary, will further minimize this potential project effect.

7.4.1 Land Use Planning

Since the proposed Project is located within an existing transmission right-of-way, no potential effects on land use planning from the upgrade of the transmission line will occur.

The upgraded 230 kV transmission line will be more compact since both circuits will be mounted on the same tower structures along the corridor from Essa TS to Barrie TS which will reduce the width of the transmission right-of-way. Barrie TS will be expanded; however, it will occur within Hydro One's existing property line which is zoned as industrial. In addition, work at Essa TS will occur within the existing fence line.

7.4.2 Transportation

There is some potential for disruption to vehicular traffic in the study area during the construction phase; however, it is expected to be minimal and temporary in nature.

To minimize disruptions and/or delays to local road traffic and emergency public safety services, construction areas and access points will be carefully designed to avoid and minimize adverse effects. If required, Hydro One and contractors will develop a Traffic Management Plan in consultation with the Township of Springwater and the City of Barrie. Advanced notice will be provided to the Township and City, adjacent landowners, commercial establishment operators, railway operators, regional transit operators and emergency response services outlining the location of entry/exit points for construction sites as well as the schedule for construction work in those areas. Road signage and flagpersons will also be used, as necessary.

7.4.3 First Nations Lands and Territory

As indicated in section 4.4.3, there are no First Nation Reserve Lands located within the study area. Hydro One is committed to developing and maintaining relationships of mutual respect between Hydro One and First Nation and Métis communities. Hydro One recognizes that First Nation and Métis communities and their lands are unique in Canada, with distinct legal, historical and cultural significance. Hydro One is committed to continue to engage with the First Nation communities as identified by the Crown to provide regular project updates.

During the consultation process, no First Nation communities expressed concerns regarding the proposed Project. The Huron-Wendat requested a copy of the Stage 1 archaeological assessment and to have an FLR from the community participate in the Stage 2 archaeological assessment. Hydro One provided the Stage 1 archaeological assessment

report and coordinated the participation of an FLR during the Stage 2 archeological assessment. The Beausoleil First Nation requested a copy of the draft ESR for review which will be provided to them in advance of the draft ESR review period. The Chippewas of Georgina Island requested to be notified should any other First Nation have objections with the proposed Project. Hydro One will continue to welcome feedback and provide project updates.

7.4.4 Human Health

EMF are physical and invisible fields produced by electrically charged objects, such as electrical equipment, power cords, and wires that carry electricity. Although they are often referred to together as EMF, electric and magnetic fields are actually two distinct components of electricity. Hydro One is committed to meet safe EMF exposure levels for all of their facilities and EMF are taken into consideration during the design of any new facility. This commitment ensures that Hydro One employees maintaining its facilities, as well as members of the public in the vicinity of these facilities are not exposed to elevated EMF levels.

Regarding research on EMF, Health Canada's conclusion is that there is no conclusive evidence of adverse health effects caused by EMF exposure from power lines (Health Canada, 2016). Health Canada's Fact Sheet that addresses issues related to EMF is available in Appendix D. Hydro One has received questions relating to EMF levels during public consultation (see section 3.6).

EMFs are strongest when close to their source. As you move away from the source, the strength of the fields fades rapidly. Standards specifying limits on exposure to EMFs include those published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 2010) and by Institute of Electrical and Electronics Engineers (IEEE, 2005). Within the right-of-way, only the IEEE Standard provides guidance for directly below overhead transmission line conductors, accepting electric field strengths up to 10,000 volts per metre (V/m). For magnetic fields, ICNIRP (2010) specifies 2000 milligauss (mG) for general public exposure outside of the right-of-way. The World Health Organization (WHO) has concluded that EMF exposures below the limits recommended in the ICNIRP/IEEE guidelines do not appear to have any known consequence on health.

A study was executed to calculate the change in EMF of the proposed Project. The following study parameters were considered in calculating project-specific EMF:

- Vertical and horizontal locations of phase conductors and shield wires based on preliminary structure design;
- Electric fields and Magnetic fields calculated at 1 m above ground;
- Electric fields calculated at max line voltage levels;
- Magnetic fields calculated at balanced line currents as stated; and
- Specified sag was considered throughout the entire span to be conservative.

Electric field strength is proportional to the voltage level of the circuits. Therefore, by increasing the operating voltage of the new circuits from 115 kV to 230 kV, the electric field strength of the new line will be approximately twice as strong as the existing, increasing from 484 V/m to 745 V/m. Even with the increase, the electric field remains significantly lower than the 10,000 V/m specified by the IEEE. Also, the edge of the new right-of-way will be located farther from the majority of property owners as it follows the alignment of the existing southern transmission line, circuit E3B.

The magnetic field strength is proportional to the current travelling through a circuit. By doubling the operating voltage of the new circuits, the current required to supply any amount of MVA load at 230 kV is approximately half of that required to supply that same load at 115 kV. As a result, at 230 kV the magnetic field strength will be reduced to half compared to its strength when the circuits are operated at 115 kV. Under normal operating conditions and 130 MVA loading, the magnetic field strength at the edge of the right-of-way decreases from 18 mG to 9 mG as the operating voltage is increased from 115 kV to 230 kV. Therefore, the magnetic field strength is expected to decrease as a result of the proposed Project and remain significantly lower than the 2000 mG specified by the ICNIRP.

It was concluded that all electric and magnetic field values at the transmission lines are expected to remain significantly below the general public exposure guidelines.

7.5 Mineral Resources

As discussed in section 4.5, there are areas within the right-of-way used for the extraction of aggregate. During construction, the aggregate pit operation company will be consulted to best manage any disruption to their operations. Since the proposed Project involves the removal of one transmission line which currently traverses an aggregate pit, the footprint of the right-of-way will be reduced within the pit. It is anticipated that construction will be a temporary disturbance but after construction is complete, the configuration of the proposed transmission line will be beneficial to extraction of aggregate.

7.6 Natural Environment Resources

Based on desktop data and field surveys, natural environment resources were identified within the study area. Avoidance, minimization and mitigation measures for any potential impacts to natural environment resources have been identified and are provided below.

7.6.1 *Physical Environment*

Physiography and Geology

With backfill, grading and site restoration following construction, physiography or surficial and bedrock geology in the vicinity of the proposed Project are not predicted to be affected. Therefore, no residual effects on the physical environment have been identified for the proposed Project.

Spills

During construction, there is the possibility of spills from the release of oils and fuels from construction vehicles and equipment. There are a number of mitigation measures to reduce the risk of spills and to minimize the effect in the unlikely event that a spill occurs. These measures include:

- Refuelling of all vehicles and equipment in a designated location located away from sensitive receptors, such as wetlands;
- Locating spill cleanup equipment nearby and in Hydro One vehicles;
- Cleaning spills and remediating the site as soon as possible after a spill; and

- Storing any fuels, chemicals and lubricants on level ground in properly contained storage areas.

During any phase of the project, in the event of an accidental spill of any material such as waste oil, fuel, lubricants or other pollutants, the spill will be reported, managed and cleaned up in accordance with pertinent legislation and Hydro One procedures. All spills are to be reported to the MOECC Spills Action Centre (SAC).

Waste Generation

Construction waste will be generated by the proposed Project, and will need to be disposed of in regional landfills and recycling facilities. Waste generated during construction will be tested, handled, stored, transported, and disposed of at licensed recycling and waste disposal facilities, as required, in accordance with applicable legislation. Waste produced will be minimized, segregated, and recycled where possible.

7.6.2 Atmospheric Environment

Climate

It is important to note that the proposed Project is not a power generation project and its operation will not emit greenhouse gases. However as mentioned in section 7.4, there will be temporary emission of fossil fuels from the vehicles and equipment used to upgrade and maintain this transmission line and station equipment. Hydro One adheres to initiatives such as anti-idling requirements and GPS installation in vehicles to optimize routing to reduce fossil fuel emissions. The emissions directly related to the construction and maintenance of this project will be minimal.

Hydro One recognizes that a changing climate is likely to result in an increase of unusual weather patterns and severe weather events, which could potentially damage or adversely affect infrastructure and other public facilities. Hydro One is confident that the facilities being planned for this project have been engineered to adequately withstand the effects of climate change throughout the duration of their planned lifespan.

Air Quality

Construction has the potential to temporarily affect local air quality in the immediate vicinity of the proposed Project. Emissions from construction are primarily comprised of fugitive dust and combustion products from the movement and operation of construction equipment and vehicles. Potential effects associated with construction are anticipated to be minimal due to their short and intermittent duration. As a result, construction emissions are not anticipated to have a long-term effect on local air quality.

Potential effects to air quality from construction activities can be mitigated through:

- Proper servicing and maintenance of construction vehicles and equipment to assist in reducing combustion emissions;
- Adhering to Hydro One's Fleet Services Environmental Program, which includes anti-idling requirements and GPS installation in vehicles to optimize routing; and
- Implementing best management practices, such as on-site watering and road cleaning to reduce the generation of fugitive dust.

Therefore, it is anticipated that the net effects of construction activities on local air quality will be negligible and no additional mitigation is required.

During the operation of the transmission line, no additional emissions are expected with the exception of periodic maintenance activities, such as inspection from vehicles. Emissions from maintenance activities are expected to be short in duration, and will occur periodically over the life of the proposed facilities. These maintenance activities are not expected to result in long-term changes to local air quality. Therefore, residual air quality effects associated with maintenance and operation activities will be negligible. No additional mitigation is required.

Noise and Vibration

Construction activities may be a potential source of short-term, intermittent local environmental noise. This is because the proposed Project is linear and construction activities will be planned sequentially. The duration of construction at any one location along the right-of-way will be limited and intermittent; thereby, reducing the amount of time a

given point of reception will be exposed to noise emissions resulting from the proposed Project.

All work is expected to be completed using common construction methods. The noise associated with the construction will most likely be a result of activities, such as general site grading, foundation work and construction traffic. All of these activities will require the use of various pieces of heavy equipment, such as bulldozers, front-end loaders, small trucks, backhoes, bobcats, dump trucks, compactors, concrete trucks and/or cranes. The movement of delivery and worker vehicles will also add to the noise levels during the construction period.

Noise from construction activities is regulated at the municipal level through by-laws, which typically limit construction activities during certain days of the week and periods of the day. During construction, Hydro One will comply with the City of Barrie Noise By-law No. 2006-140 (2006) and the Township of Springwater Noise By-law No. 2012-015 (2012). However, there may be instances where noise by-law exemptions are sought (e.g., after-hours or weekend work). If exemptions are necessary, the requirements of applicable approvals processes will be met. Hydro One and contractors will also notify local residents and businesses if the activities need to be extended to facilitate their completion.

Noise sources and noise levels from maintenance activities after construction will be variable, are expected to be limited to a short duration, and will occur periodically over the life of the proposed facilities. With the exception of periodic maintenance activities (inspection from ground-based vehicles and vegetation maintenance), no additional noise sources are expected as a result of the transmission line upgrade during the maintenance and operation of the transmission line. Therefore, no additional mitigation is required for noise during the maintenance and operation of the transmission line.

The proposed Project has the potential to affect ambient vibration levels during the construction phase. The MOECC guidelines and the City of Barrie Noise By-law No. 2006-140 (2006) address vibration requirements. Any construction vibration will be temporary in nature, occur only during specific activities, and be limited to the immediate vicinity of the construction work area. The range in the increased vibration levels associated with

construction activities will depend primarily on the number and type of sources and their proximity to the points of reception.

Mitigation measures to reduce potential nuisance effects resulting from vibration include: the consideration of vibration when selecting equipment and construction work methods, and determining work schedules for the proposed Project. Hydro One will take reasonable measures to control vibration related to construction near residential areas.

7.6.3 Surface Water Resources

During construction, the potential effects of the proposed Project on surface water include changes in surface water quantity or quality conditions in nearby watercourses due to site preparation, construction of watercourse crossings, earthworks and discharge of construction water, and operation of vehicles and equipment.

There are no activities for the proposed Project during the maintenance and operation phase that have the potential to influence surface water quality conditions in nearby watercourses, thus potential effects have not been identified.

Section 4.6.3 identified areas within the study area which are regulated by the LSRCA and NVCA. For work within Regulated Areas, LSRCA and NVCA will be consulted prior to and throughout construction, as necessary, and their feedback will be incorporated into design and construction.

Surface Water Quantity

Proposed project activities during the construction phase that have the potential to influence surface water quantity conditions in nearby watercourses are:

- Site preparation for the new transmission structures, construction of access road(s) and laydown areas;
- Construction of watercourse crossing, and construction in wetland areas; and
- Discharge of construction water from dewatering activities.

Site preparation, including activities such as removal of vegetation, locates/daylighting of potential existing buried utilities, and construction of access roads, will be required in

relation to the work areas for the transmission structure installation, as well as the work areas adjacent to the Barrie TS and the Essa TS.

The proposed route for the new 230 kV transmission line will use an existing right-of-way. The number and location of access roads and entrances will be established during the detailed design phase, though gates and entrances are contemplated on either side of George Johnson Road and Grenfel Road (there are existing entrances at Miller Drive).

Site preparation will also be required for laydown areas, and “puller pads”; the locations of which have not been established. It is expected that, where possible, these areas will be placed outside of the wetland or in areas of the wetlands that have been drained for other uses (e.g., agriculture, etc.). The total disturbed area is expected to be a very small proportion of the total area of the Bear Creek PSW and related small watercourses, and is within an existing right-of-way, though it is acknowledged that even portions of the right-of-way are wetlands (or very high water table land).

During construction, it is expected that changes to streamflow and water levels in the watercourses downgradient of the areas of disturbed land will reflect the proportion of disturbed area relative to the total watercourse catchment area. In the case of the Bear Creek PSW and associated wetlands, dewatering of relatively small-diameter holes for the pads and foundations of the transmission structures will be undertaken; the zones of influence of this dewatering are expected to be measured in the range of several to tens of metres radius for a brief period of time. As a result, changes to water levels in the wetland will be negligible in quantity.

At the end of construction, the work areas (i.e., structure foundation areas, access road(s), puller pad(s) and laydown areas) may be removed and then seeded or left to re-vegetate naturally and the laydown areas will be restored to their original condition to the extent feasible. Therefore, there will be negligible residual effects on surface water quantity as a result of site preparation activities.

The existing right-of-way crosses three watercourses, as described in section 4.6. Currently, it is anticipated that any watercourse crossing required by construction equipment will occur using appropriate diameter culverts and/or temporary road mats. The installation of the

culvert may require the temporary diversion or pumping of stream flows around the work area to permit construction under dry conditions. The installation of the culvert may result in local changes to flow conveyance conditions in the unnamed watercourse (e.g., area of channel cross-section could be reduced) with the potential for streamflow obstruction and backwater (water held back by the obstruction) in the channel reach immediately upstream of the crossing. This, however, is a temporary, short-lived activity.

To avoid or minimize the potential adverse effects of constructing watercourse crossings on surface water quantity, the following mitigation measures will be implemented:

- Perform any dewatering for the purposes of installation and removal of culverts or roads during low flow periods of the in-water work timing window from July 15 to October 1;
- Select a design rainfall event based on the operating life of the watercourse crossings and a level of hydrologic risk consistent with existing regulatory guidelines and/or good industry practice;
- Design the watercourse crossings to convey the peak flow for the design rainfall event without constricting streamflow and causing backwater effects in the watercourse;
- Install the watercourse crossings over a relatively short period of time (i.e., less than one week); and
- Undertake the work in consultation with LSRCA and NVCA and incorporate their feedback into design and construction.

Watercourse crossings will be removed and channel cross-sections will be restored, to the extent feasible, to their original conditions at the end of the construction phase. With the implementation of the mitigation measures described above, and the short life of the works, the construction of watercourse crossings are not anticipated to have long-term residual effects on surface water quantity.

The removal and discharge of construction water may be required as a result of dewatering activities in holes or trenches related to foundations. Discharge is expected to occur to roadside ditches, or in some cases, just to nearby lands. Discharge quantities are expected to

be relatively minor, based on the soil types that were described in the geotechnical report (Hemmera, 2017). It is not expected that an Environmental Activity and Sector Registry (EASR) or PTTW will be required from the MOECC, but this can only be established with certainty during detailed design. The discharge of construction water from dewatering activities may result in slight increases to surface water levels; however, the right-of-way already traverses wetlands with very high water levels (i.e., at or near ground surface).

To minimize the potential adverse effects of dewatering activities on surface water quantity conditions, the following mitigation measures will be implemented:

- Discharge construction water in compliance with the required permits and/or approvals from the MOECC and the Township of Springwater/City of Barrie; and
- Develop and execute appropriate construction dewatering plans (e.g., passing discharge water through a filter bag or drum before discharge) prior to construction, as required.

With the implementation of the mitigation measures described above, and the short duration of the dewatering activities, dewatering activities are not anticipated to have long-term residual effects on surface water quantity in the receiving watercourses.

Surface Water Quality

Project activities during the construction phase that have the potential to influence surface water quality conditions in nearby watercourses are:

- Site preparation for the structures, stations, adjacent access road and laydown areas;
- Earthworks associated with the construction of the access road, laydown areas, puller pads, etc.;
- Discharge of construction water from dewatering activities to the right-of-way; and
- Operation of vehicles and equipment throughout the construction phase.

Site preparation will consist of removal of vegetation, rough grading, and stockpiling of materials. These activities will result in the temporary exposure and disturbance of soil with the potential for wind and water erosion and the transport of sediment to watercourses. Site

preparation will also result in the temporary accumulation of cleared vegetation with the potential for mobilization of organic debris and its transport to local watercourses during runoff events. Earthworks will consist of excavation, fill, and stockpiling activities, and will similarly result in disturbance and exposure of soil and aggregates to wind and water erosion and the transport of sediment to watercourses. It is expected that the right-of-way will be restored to similar grades at the various areas of disturbance.

In order to avoid or minimize the potential adverse effects of site preparation activities on surface water quality in these receiving watercourses, the following mitigation measures will be implemented where practicable:

- Stage work to minimize the extent of exposed and disturbed areas at any given time;
- Remove cleared vegetation to designated areas above the high water marks of watercourses;
- Stockpile topsoil in designated areas above the high water marks of watercourses;
- Develop and execute site-specific erosion and sediment control plans, as required;
- Minimize equipment operation adjacent to watercourses, where feasible;
- Retain vegetation buffers along the banks of watercourses, where feasible; and
- Carry out work in consultation with the LSRCA and NVCA and incorporate their feedback into design and construction.

With the implementation of the mitigation measures described above, and the short duration of the construction works, site preparation activities are not anticipated to have long-term residual effects on surface water quality conditions in nearby watercourses.

Earthworks will be required for the construction of the access roads, laydown areas, puller pads within the various disturbed work areas along the right-of-way. Earthworks may also be required for the installation of culverts. Earthworks for culverts may consist of excavation, preparation of culvert pipe bedding, culvert pipe placement, and backfilling. Earthworks will also include the stockpiling of soil and aggregate materials.

Earthworks for the construction of the laydown areas, puller pads, etc., will similarly consist of excavation, fill, and sub-grade preparation, followed by the installation of crushed stone overtop a geotextile fabric. Soil and aggregate materials will be stockpiled.

Earthworks will also potentially be required during foundation preparations, though, depending on the technology, this may not be required. Earthworks to support the above activities will include the stockpiling of soil and aggregate materials.

To avoid or minimize the potential adverse effects of earthworks activities on surface water quality in nearby watercourses, the following mitigation measures will be implemented where practicable:

- Stage work to minimize the extent of exposed and disturbed areas at any given time;
- Stockpile soil and aggregates in designated areas above the high water marks of watercourses;
- Conduct the work in consultation with the LSRC and NVCA and incorporate their feedback into design and construction;
- Develop and execute site-specific erosion and sediment control plans, as required;
- Minimize equipment operation adjacent to watercourses, where feasible; and
- Retain vegetation buffers along the banks of watercourses, where feasible.

With the implementation of the mitigation measures described above, and the short duration of the construction works, earthworks activities are not anticipated to have long-term residual effects on surface water quality conditions in nearby watercourses.

The removal and discharge of construction water may be required as a result of dewatering activities in holes or trenches related to foundations. Discharge is expected to occur to roadside ditches, or in some cases, just to nearby lands. Discharge quantities are expected to be relatively minor, based on the soil types that were described in the geotechnical report (Hemmera, 2017). It is not expected that an EASR or PTTW will be required from the MOECC, but this can only be established with certainty during detailed design. The discharge water quality is expected to be similar to the near-surface water quality, as the water table is at or near-surface, and is hydrologically connected to the groundwater.

To minimize the potential adverse effects of dewatering activities on surface water quality conditions, the following mitigation measures will be implemented:

- Discharge construction water in compliance with the required permits and/or approvals from the MOECC and in consultation the LSRCA and NVCA; and,
- Develop and execute appropriate construction dewatering plans prior to construction, as required.

With the implementation of the mitigation measures described above, and the short duration of the dewatering activities, dewatering activities are not anticipated to have long-term residual effects on surface water quality in the receiving watercourses.

7.6.4 Groundwater Resources

During construction, the potential effects of the proposed Project on groundwater include changes in water quality due to disturbance of pre-existing soil contamination which may exist, changes to existing groundwater quality or quantity due to trenching activities and construction dewatering, and changes in groundwater flow regime due to installation of foundations for the transmission structures.

Changes in groundwater due to project activities during construction could also affect the amount of groundwater discharged to nearby watercourses and natural environment features (e.g., vegetation, fish and fish habitat, wetlands, etc.).

Effects on groundwater due to dewatering will be ephemeral and have a zone of influence measured in the range of several to tens of metres. The water can be discharged in some cases to the wetlands and some of this water can, in effect, infiltrate back into the wetland subsurface over time. It is anticipated that these effects will be limited to the construction phase. It is not expected that there will be any effects on groundwater during the maintenance and operation phase.

Groundwater Quality

Soil contamination is unlikely due to the nature of the surrounding land use and the existing right-of-way. Excess material that needs to be disposed of off-site will be sampled and

analyzed to determine its disposal requirements. Soil and groundwater containment and disposal measures will be implemented according to the pertinent regulations, as required.

No residual adverse effects have been identified for changes in groundwater quality due to the construction of the proposed Project. If changes in groundwater quality were to occur, it is anticipated that groundwater quality will return to baseline conditions following the implementation of mitigation measures, such as containment and removal of contaminated soils.

Groundwater Quantity

The foundation holes or excavations for each of the transmission structures will intercept the water table in some areas; however, the quantity of groundwater dewatering and the zone of influence from the dewatering are expected to be measured in several to tens of metres from the dewatering location. There will be some excavation required for the upgrades at Barrie TS. Similarly, the quantity of groundwater dewatering and the zone of influence from the dewatering of excavation for foundations is expected to be measured in several to tens of metres from the dewatering location. Following completion of dewatering and backfilling of foundation holes, trenches or excavations, the recovery of the groundwater table within these permeable features to preconstruction conditions will likely take place relatively rapidly during the construction period, or potentially extending into the maintenance and operation phase under less permeable conditions.

Groundwater baseflow (quantity) is seasonally important to nearby waterbodies and natural environment features, including vegetation, fish and fish habitat, and wetlands. The effects on groundwater quantity associated with construction of foundations are anticipated to be local to the hole or excavation. Foundation excavations will be backfilled in a timely manner. As such, it is predicted that there will be no or limited temporal effects on groundwater levels and quantity as a result of construction activities. Therefore, no effect on groundwater baseflow delivered to adjacent water bodies and natural environment features is expected.

Construction is occurring within an existing right-of-way, largely within an existing PSW. Groundwater discharge will be to roadside ditches, or to the surrounding ground. There will

be some runoff from this discharge and some infiltration. However, as the water table in wetland and outside of the wetland is from near-surface to at-surface, there is not expected to be any adverse effect to any groundwater resources due to construction.

If detailed design suggests that construction dewatering of foundation holes/excavations is required at a rate greater than 50,000 L/day, a PTTW or EASR will be obtained from the MOECC. The proposed Project will comply with applicable guidelines and legislation, including Provincial Water Quality Objectives, Ontario Drinking Water Standards, Objectives and Guidelines and Ontario Regulation (O. Reg.) 153/04. Adequate dewatering and discharge plans will be developed prior to construction, and collected water will be contained and tested prior to disposal.

The municipal wells and local private water wells within the area will not be affected in any measurable way by proposed dewatering of foundation holes or excavations within the stations. The zone of influence of such dewatering activities is very localized, and the majority of water wells exploit aquifer(s) that are at a much greater depth than the proposed excavations.

The effects of the dewatering activities during construction are expected to be temporary, and groundwater levels and flow are expected to return to pre-construction conditions during the construction period. The nature of the sub-surface soils, the existence of a high water table regime along the right-of-way, and the small zone of influence to be created by construction dewatering is expected to result in a recovery to the pre-disturbance state in a matter of several days.

7.6.5 Designated or Special Natural Areas

Bear Creek PSW was identified within the study area. Therefore, there is potential for the proposed Project to affect PSWs. There will be some disturbance to the PSW during construction as access and structures will be within wetland areas. In order to minimize or avoid any negative effects within the wetland areas, the following mitigation measures will be implemented:

- Locate structures to the extent practicable, to minimize number in the significant natural features;
- Implement appropriate erosion control measures;
- Maintain liquid storage areas and refuelling areas away from wetland areas;
- Restrict construction activities to designated work areas and erect protective fencing, as required;
- Undertake road access construction (using geotextile fabric overlain by clean crushed granular material) and cut during firm ground conditions, if practicable;
- Remove non-woody vegetation at ground level leaving existing root systems in the ground;
- Allow wetland vegetation to re-establish naturally or seed with native grasses (no fertilizer application);
- Remove road building materials and geotextile for appropriate disposal/re-use, as necessary; and
- Restore to pre-construction drainage patterns.

Judicious placement of structures and access roads, implementation of appropriate mitigation measures and adherence to site-specific restoration plans will minimize net-effects on the wetland. After completion of the proposed Project, the width of the right-of-way within the wetland will be narrowed, thereby reducing the footprint of the infrastructure within the wetland.

7.6.6 Natural Heritage Features

The nature of the construction disturbance associated with the proposed Project is temporary. This disturbance will occur within an existing disturbed right-of-way and within mostly disturbed areas within and surrounding Essa TS and Barrie TS. No effects on natural heritage features are anticipated during the maintenance and operation phase.

Construction activities will be restricted to designated work areas and protective barriers, such as fencing, will be erected to protect adjacent features from construction related effects. For example, silt fencing and/or other sediment and erosion control measures will be installed as required to prevent the migration of sediment-laden water from the site, and tree

protection boarding will be installed adjacent to vegetation areas to prevent encroachment or damage during construction. In addition, vegetation removal limits will be clearly demarcated. Prior to construction, a detailed construction plan will be developed and the Township of Springwater, City of Barrie, LSRCA and NVCA will be consulted.

Other measures that will be undertaken to reduce adverse effects resulting from the construction of the proposed Project include:

- Restricting access and minimizing travel/work areas to maximize retention of compatible vegetation;
- Implementing sediment and erosion controls;
- Selectively cutting and retaining compatible vegetation to promote regeneration;
- Using geotextile and gravel for access, where feasible, to reduce compaction;
- Restoring compacted areas, if required;
- Retention of compatible vegetation in constraint areas (e.g., road and watercourse crossings, wetlands, etc.); and
- Installing barriers (e.g., silt fences) to promote protection of watercourses.

In most locations, geotextile and gravel used for access will be removed upon completion of construction. Laydown areas will be constructed and these areas will be restored following removal of the laydown areas post-construction.

Most wildlife species that occur in the study area are habituated to human activities and are mobile. Any sensitive resident animals can relocate temporarily to avoid noise and disturbance associated with construction activities and return after construction completion. Construction disturbance will be sufficiently local and transitory that little displacement of wildlife is anticipated. Therefore, the effect of the proposed Project on wildlife will be minimal. Wildlife will not be harassed or harmed during construction.

Removal of vegetation has the potential to disturb nesting migratory birds. The *Migratory Birds Convention Act, 1994* (MBCA) prohibits the disturbance, destruction or removal of a nest, egg or nest shelter of a migratory bird. In order to avoid contravention of the MBCA,

vegetation removal should not be conducted during the migratory bird breeding season from April 5 to August 31 in nesting zone C2 as provided by ECCC (2017c), where feasible. The MNRF confirmed that this timing window for vegetation removal should be respected to protect bird and bat species.

In naturalized areas, removed vegetation will be left in place to minimize disturbance. Removed vegetation in populated area will be carefully cleaned up and disposed of. Specifically, non-salvageable limbs will be chipped or removed to designated areas. Stumps will be cut flush with the ground where feasible.

Invasive Species

There is potential for the proposed Project to facilitate the spread of non-native or invasive species that may occur within or adjacent to work areas during the construction phase. Measures that will be undertaken to reduce the spread of invasive species include:

- Seeding and fertilizing previously vegetated areas (excluding wetlands) with native seed mix;
- Taking care to avoid spreading invasive species (especially invasive plant species) that occur in or adjacent to work areas, and educating crews on the importance of preventing the spread of invasive species;
- Abiding by the *Invasive Species Act* regulations;
- Removing and properly disposing of invasive plant material, where feasible; and
- Inspecting and cleaning equipment and vehicles as necessary prior to entering/leaving vegetated work areas, to reduce potential for spreading invasive species propagules.

Wetlands

The existing transmission line crosses a number of evaluated non-provincially significant wetland areas adjacent to Bear Creek PSW. Mitigation measures described in section 7.6.5 will be employed in the non-provincially significant wetlands as well.

Fish Habitat

Fish habitat is present in the right-of-way within the Bear Creek PSW where work will be carried out. There is potential for fish habitat to be affected during the construction phase of the proposed Project as watercourse crossings will be required to facilitate construction activities. It is not anticipated that in-water works will be required as the watercourses are less than 1 m wide in most areas; however, if required, necessary permits and approvals will be obtained before work commences.

Other potential disturbances to fish habitat resulting from construction activities near water will be minimized through the development of an erosion and sediment control plan, which will include mitigation measures, such as constructing access roads during low flow conditions, retaining stream bank vegetation, and storing materials away from water. In addition, no refuelling of vehicles and/or equipment will be permitted nearby a watercourse or wetland area to avoid potential spills (e.g., fuel, oil, lubricant) from migrating and entering aquatic features or wetland areas. Spill kits will also be located at work areas to mitigate the effects of accidental spills or releases, should they occur during construction.

Woodlands

Significant woodlands have not been identified and mapped in the Official Plans (City of Barrie, Township of Springwater), but are shown as natural heritage areas. The swamp areas of Bear Creek PSW are large wooded areas located within the study area which would qualify as significant woodlands on either side of the right-of-way and adjacent to the activities associated with the proposed Project.

In general, removal of woody vegetation will be minimized during construction to the extent feasible. In the case that the removal or significant injury to trees is necessary to carry out project activities, Hydro One will notify the appropriate agencies and obtain all necessary permits prior to tree removal, if needed. Trees and taller shrub species in the wetland areas of the right-of-way that may have to be removed to carry out project activities are largely willow and alder and some poplar which readily propagate. There are no mature trees in the cultural meadow areas within the right-of-way. Some coniferous and deciduous saplings are scattered throughout the right-of-way.

Once detailed design for the transmission structures locations and Barrie TS expansion has been completed, a detailed tree inventory will be conducted to determine the extent of tree removal that will occur as a result of construction activities. Tree removal permits will be obtained from the Township of Springwater and City of Barrie, if required.

Valleylands

There are no valleylands present in the study area; therefore, no effects on valleylands as a result of the proposed Project are anticipated.

Species at Risk

As noted in section 4.6.6, species designated as either endangered or threatened under the Ontario *Endangered Species Act, 2007* are provided individual and habitat protection. Species designated as special concern under the *Endangered Species Act, 2007* do not have regulatory protection and are not discussed further. Bobolink was the only SAR (categorized as endangered or threatened under the *Endangered Species Act, 2007*) identified in the study area during the 2016/2017 field surveys. Bobolink receives general habitat protection focused on nest sites and surrounding habitat as it was confirmed to be breeding in the meadow adjacent to the right-of-way. Bobolinks are also protected by the MBCA. Vegetation removal during the migratory bird breeding season – April 5 to August 31 in nesting zone C2 (ECCC, 2017c) will be avoided to the extent feasible. A non-intrusive breeding bird nest survey will be undertaken by a qualified avian biologist if vegetation removal is required during this period. Should nest sites of these species be identified, protective measures (e.g., buffers) as described in the general habitat descriptions for this species will be implemented (MNR, 2013). Surveys will be performed prior to work occurring within cultural meadows between the April 5 to August 31 breeding bird timing window to avoid impacts to SAR birds. Should SAR birds be present, advice will be sought from the MNRF Midhurst District.

Should other SAR or their habitat be encountered during construction activities, the required works will be assessed to determine whether the work/schedule can be modified, or mitigation measures can be employed to avoid potential effects on SAR and their habitat. If

avoidance of effects to a SAR is not possible, Hydro One will communicate with the MNRF, and if required, seek permits from the MNRF.

Wildlife Habitat

Several forms of significant wildlife habitat were identified in the natural heritage study area during 2016-2017 field surveys. However, alteration or loss of wildlife habitat (including significant wildlife habitat) as a result of project activities are not anticipated as the vegetation removal will be limited and disturbance only temporary.

During project activities, the following will be taken into consideration:

- Retention of snags and cavity trees where feasible;
- General avoidance of wetlands, if possible;
- Promotion of wildlife habitat through vegetation control;
- Retention of natural vegetation, where possible; and,
- Use of native plant species where seeding or planting is completed.

Significant Areas of Natural and Scientific Interest

There are no ANSIs in the study area; therefore, no effects on significant areas of natural and scientific interest as a result of the proposed Project are anticipated.

Biodiversity Initiative

While Hydro One always strives to avoid and mitigate potential effects to the natural environment, and restore areas that are temporarily affected during construction, Hydro One also acknowledges that there may be adverse effects that cannot be avoided, or that occur even when appropriate mitigation and restoration measures are employed. Examples include temporary effects to wetland habitat, or the displacement of natural habitat by structure footings. Hydro One refers to these as “residual net effects” to the natural environment. Because residual net effects cannot be further avoided or mitigated, they are typically compensated for by undertaking positive environmental activities (e.g., the creation of new natural communities or enhancement of existing ones) at other locations.

Hydro One has committed to undertaking a biodiversity initiative specific to this project to compensate for any potential residual net effects to natural communities or resources that may occur. The biodiversity initiative will involve the funding of third-party projects or proposals (opportunities), such as wetland and wildlife habitat creation and enhancement, or watercourse restoration and enhancement. Following completion of the Class EA process, habitat creation/enhancement opportunities will be solicited from potential partners. Opportunities will be screened to ensure that they meet the objectives of the biodiversity initiative and other mandatory criteria (e.g., suitable ecological objectives, occur on secured lands). It is expected that funding and the subsequent commencement of work by the selected partners will begin as construction on the proposed Project is underway.

7.7 Recreational Resources

It is predicted that some recreational resources may be temporarily disturbed during the construction phase, due to the establishment of laydown areas, activities in existing right-of-way and the presence of construction equipment and project workers. It is expected that recreational users may face some temporary and intermittent loss of access to and enjoyment of the areas that are in the vicinity of construction areas due to public safety considerations. Loss of access is expected to be short-term in nature due to the duration of the construction phase. Clear signage will be erected in relevant areas, and Hydro One and contractors will provide notification/pre-construction information to area residents detailing construction schedules and routes. Site restoration (e.g., restoration seeding and planting) will be used, where feasible, to minimize long-term visual and environmental impacts to recreation areas. Following construction, in the operations stage of the proposed Project, activities in the transmission right-of-way will return to pre-construction conditions.

7.8 Visual and Aesthetic Resources

As described in section 4.8, the proposed Project is located within an existing transmission right-of-way and within existing TS properties, which minimizes effects to the landscape. In general, the area surrounding the study area consists of industrial areas in the east and west ends near the Barrie TS and Essa TS, and agricultural, natural heritage areas, and residential areas along the right-of-way. Since the proposed Project is located within an existing

transmission right-of-way, it is not anticipated to significantly alter the visual appearance of the landscape.

In order to compare the existing and proposed visual effects of the transmission line, visual simulations were completed using an example structure type with an approximate structure height. The type and height of structure will be determined during detailed design.

Figures 7-1 to 7-4 show viewpoints from four locations along the right-of-way to compare the visual effects of the existing and proposed structures.

The existing landscape currently contains the existing transmission right-of-way and other existing utility infrastructure. The narrowing of the right-of-way width due to the installation of a single line of structures instead of two side-by-side transmission lines will reduce the physical and visual space the structures will occupy. A pre-construction PIC will be held with the community to discuss the structure design and locations along the existing right-of-way.

During construction, Hydro One will minimize visual impacts on properties adjacent to the proposed project by:

- Maintaining safety fencing where construction will occur;
- Maintaining a clean and organized workspace;
- Removing non-compatible vegetation by chipping or removal to designated areas, where possible;
- Where tree removal is required, cutting remaining stumps flush with the ground, where feasible; and
- Performing an on-site assessment after construction to determine if restoration (e.g., grading, grass seeding, etc.) of disturbed areas along the right-of-way is required.

EXISTING CONDITIONS



PROPOSED CONDITIONS



Figure 7-1: Photo Simulation – View Looking North up Grenfel Road

EXISTING CONDITIONS



PROPOSED CONDITIONS



Figure 7-2: Photo Simulation – View Looking East off Miller Drive

EXISTING CONDITIONS



PROPOSED CONDITIONS



Figure 7-3: Photo Simulation – View Looking South down Kraus Road

EXISTING CONDITIONS



PROPOSED CONDITIONS



Figure 7-4: Photo Simulation – View looking East off Dunlop Street West

7.9 Summary of Potential Environmental Effects, Mitigation Measures, and Residual Effects

Table 7-1 provides a summary of potential effects, the associated mitigation, and the residual effects identified for the proposed Project.

Table 7-1: Summary of Potential Effects, Mitigation Measures and Residual Effects

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
EFFECTS TO AGRICULTURAL RESOURCES			
Agricultural Resources	Temporary impacts to agricultural resources during construction.	<ul style="list-style-type: none"> • Access roads will be built using geotextile and crushed rock and will be removed in agricultural lands after construction is complete. • Compensation will be paid to the property owner for damages to crops, tile drainage, farm equipment and livestock. • Structure location and access road lay-out will be discussed with property owner prior to location finalization to minimize disruption and damage. • Contact will be maintained with land owners/tenants regarding work schedule, fencing, gates, noise, tiles and remediation measures. 	No residual effects are predicted.
	Displacement of agricultural land by structure footings.	<ul style="list-style-type: none"> • Hydro One will make all efforts to design the transmission line in order to minimize the footprint of the transmission structures and to maximize the available land for agricultural use. 	No residual effects are predicted.
EFFECTS TO CULTURAL HERITAGE RESOURCES			
Archaeological Resources	Impacts to archaeological resources during construction.	<ul style="list-style-type: none"> • If archaeological material is encountered during the course of the project, Hydro One will immediately cease all activities with the potential to affect the archaeological material and engage a licensed archaeologist, as well as the MTCS, and the First Nation communities that were consulted with for the proposed Project. • In the event that human remains are encountered, Hydro One will immediately stop work in the area and notify the police, the coroner's office, MTCS and the Registrar of Cemeteries. 	No residual effects are predicted.
EFFECTS TO HUMAN SETTLEMENTS			
Public Safety	Construction sites pose potential	<ul style="list-style-type: none"> • Installing fencing/barriers with appropriate signage to prevent unauthorized 	No residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
	safety hazards to public, if not appropriately controlled.	access to work areas. <ul style="list-style-type: none"> • Consulting with the Township of Springwater and City of Barrie regarding the construction schedule. • Providing the final construction schedule to emergency and protective services. • Providing early notice to adjacent residents, landowners, and businesses of the proposed project activities prior to construction and performing ongoing communication and consultation throughout construction. 	
Air Quality	Exhaust emissions may be generated from vehicles and equipment during the construction phase.	<ul style="list-style-type: none"> • Equipment used on site during construction and operation is properly maintained to minimize exhaust. • Adherence to Hydro One’s Fleet Environmental Program which includes anti-idling requirements and GPS installation in vehicles to optimize routing. 	No residual effects are predicted.
	Dust may be generated from vehicles and equipment during construction.	Use effective dust suppression techniques, such as on-site watering and road cleaning.	No residual effects are predicted.
Noise	Noise emissions may be generated during the construction phase.	<ul style="list-style-type: none"> • Maintain equipment to ensure that construction and operation conforms to normal noise parameters. • Noise is taken into account when deciding on equipment, construction work methods and schedule. • Take reasonable measures to control construction-related noise near residential areas. • Conform to the City of Barrie and Township of Springwater noise by-laws; if exemptions to the noise by-laws are necessary, the requirements of applicable approvals processes will be met and residents, land users and 	No residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
		businesses will be informed.	
Vibration	Vibration may be generated during the construction phase.	<ul style="list-style-type: none"> • Consideration of vibration when selecting equipment and construction work methods, and determining work schedules for the proposed Project. • Take reasonable measures to control vibration related to construction near residential areas. 	No residual effects are predicted.
Mud	Mud may accumulate due to site preparation and construction activities during the construction phase.	<ul style="list-style-type: none"> • Mud will be removed from roads, as required. • Mud mats may be installed to reduce effects. • Vehicles and equipment will be washed and maintained at work areas, as necessary. • Formal cleanup and site restoration (e.g., grass seeding), if necessary, will further minimize this potential project effect. 	No residual effects are predicted.
Transportation			
Traffic disruption	Short-term disruption of traffic may occur in project vicinity due to equipment and materials delivery and worker vehicular traffic during the construction phase.	<ul style="list-style-type: none"> • Construction activities will be scheduled where possible to avoid significant inconvenience. • Develop approved traffic control plan in consultation with the City of Barrie and Township of Springwater, as necessary. • Erect road signage and provide notification/pre-construction information to area residents on timelines and construction routes. • Where appropriate, assign traffic control officers or flagpersons to assist construction truck entry and exit. 	No residual effects are predicted.
Human Health			
Electric and Magnetic Fields (EMF)	EMF levels in vicinity of the transmission facilities.	<ul style="list-style-type: none"> • Facilities are designed, sited and operated in accordance with all regulatory requirements. • The design of the transmission line will reduce EMF to the extent possible. 	No residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
		<ul style="list-style-type: none"> • Anticipated levels of EMF are anticipated to remain significantly lower than the general public exposure guidelines. 	
EFFECTS TO MINERAL RESOURCES			
Aggregate Extraction	Potential temporary disturbance to aggregate extraction.	<ul style="list-style-type: none"> • Aggregate pit operation companies will be consulted with to best manage any disruption to their operations. 	No residual effects are predicted.
EFFECTS TO NATURAL ENVIRONMENTAL RESOURCES			
Physical Environment			
Spills	Incidental spills of oils, fuels and other liquids during construction.	<ul style="list-style-type: none"> • Refuelling of all vehicles and equipment to be undertaken in a designated location away from sensitive receptors. • Spill cleanup equipment to be nearby and in Hydro One vehicles. • Spills will be cleaned up as soon as possible and the site remediated after a spill. • Any fuels, chemicals and lubricants are stored on level ground in properly contained storage areas. 	No residual effects are predicted.
Waste Generation	Solid and/or liquid waste will be generated during construction.	<ul style="list-style-type: none"> • Minimize waste produced and segregate and recycle where possible. • Test, handle, store, transport and dispose of waste in accordance with all applicable legislation prior to being recycled or disposed at a licensed landfill. 	No residual effects are predicted.
Surface Water Quantity			
Runoff Rates and Volumes from Proposed Project Sites	Changes in streamflow and water levels in receiving watercourses during the construction phase and the maintenance and operation phase as a result of changes in land cover.	<ul style="list-style-type: none"> • Re-vegetate the new work areas (i.e., structure locations, adjacent access roads, puller pads, and laydown areas) to the extent feasible. • Restore the laydown areas to their original condition to the extent feasible. 	Negligible residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
Flow Conveyance and Hydraulics at Watercourses	Impedance of streamflow and creation of backwater effects as a result of installing watercourse crossings during the construction phase.	<ul style="list-style-type: none"> • Select an appropriate design rainfall event based on the operating life of the crossing and a level of hydrologic risk consistent with regulatory guidelines and/or good industry practice. • Design the crossing to convey the peak flow for the design rainfall event without constricting streamflow and causing backwater effects in the watercourse. • Install the crossing over a relatively short period of time. • Carry out work in consultation with NVCA and incorporate their feedback into design and construction. 	No residual effects are predicted.
Discharge of Construction Water from Dewatering Activities	Changes in streamflow and water levels in receiving watercourses during the construction phase.	<ul style="list-style-type: none"> • Discharge construction water in compliance with the required permits and/or approvals. • Discharge construction water to a filter bag, and, in turn, to ground surface (i.e., vegetated area) to reduce the concentration of suspended solids. • Develop appropriate discharge plans prior to construction, as required. 	No residual effects are predicted.
Surface Water Quality			
Organic Debris and Sediment Loads in Watercourses	<p>Mobilization and transport of organic debris to nearby watercourses as a result of site preparation and earthworks during the construction phase.</p> <p>Erosion and transport of sediment to nearby watercourses as a result</p>	<ul style="list-style-type: none"> • Stage work to minimize the extent of exposed and disturbed areas at any given time. • Remove cleared vegetation to designated areas above the high water marks of watercourses. • Stockpile soil and aggregates in designated areas above the high water marks of watercourses. • Develop and execute site-specific erosion and sediment control plans, as required. • Minimize equipment operation adjacent to watercourses, where feasible. • Retain vegetation buffers along the banks of watercourses, where feasible. 	No residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
	of site preparation, earthworks, and discharge of construction water from dewatering activities during the construction phase.	<ul style="list-style-type: none"> • Carry out work in consultation with the LSRCA and NVCA and incorporate their feedback into design and construction. • Develop appropriate discharge plans prior to construction, as required, and in compliance with the required permits and/or approvals. 	
Erosion	Soil may be lost during site preparation due to rainfall.	<ul style="list-style-type: none"> • Use mechanical erosion control devices, as required, such as erosion control blankets and sedimentation fences. 	No residual effects are predicted.
Groundwater Quantity			
Removal and Disposal of Groundwater from Dewatering Activities	Removal of groundwater may result in temporary lowering of aquifers.	<ul style="list-style-type: none"> • The proposed Project will comply with applicable guidelines and legislation, including Provincial Water Quality Objectives, Ontario Drinking Water Standards, Objectives and Guidelines and O. Reg. 153/04. • Discharge of water from dewatering activities will be in compliance with required permits and approvals. • Develop adequate dewatering and discharge plans prior to construction, if required. • Contain collected water and conduct testing prior to disposal, if required. 	No residual effects are predicted.
Designated or Special Natural Areas			
Designated Natural Areas	Effects to the Bear Creek PSW during construction activities.	<ul style="list-style-type: none"> • Locate transmission structures to the extent practicable, to minimize number in the significant natural features. • Implement appropriate erosion control measures. • Maintain liquid storage areas and undertake refuelling away from wetlands. • Restrict construction activities to designated work areas and erect protective fencing, as required. • Undertake road access construction (using geotextile fabric overlain by clean crushed granular material) and cut during firm ground conditions, if practicable. 	No residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
		<ul style="list-style-type: none"> • Remove non-woody vegetation at ground level leaving existing root systems in the ground. • Allow wetland vegetation to re-establish naturally or seed with native grasses (no fertilizer application). • Remove road building materials and geotextile for appropriate disposal/re-use, as necessary. • Restore to pre-construction drainage patterns. 	
Natural Heritage Features			
Vegetation	Removal of vegetation within proposed construction activity areas in the right-of-way during construction and maintenance activities.	<ul style="list-style-type: none"> • Clearly demarcate limits of vegetation removal. • Restrict construction activities to designated work areas and erect protective barriers such as fencing as required. • Restrict access and minimize travel/work areas and selectively cut and retain compatible vegetation to promote regeneration and to maximize retention of compatible vegetation. • Implement sediment and erosion controls. • Use geotextile and gravel for access, where feasible, to reduce compaction. • Restore compacted areas. • Replant with compatible native species. • Designate and track special treatment areas, such as areas of contaminated soils, imported fill, and invasive vegetation species for future reference during maintenance activities. • Use selective vegetation control methods. 	No residual effects are predicted.
	Accumulation of cleared vegetation during the construction phase.	<ul style="list-style-type: none"> • Seed and fertilize previously vegetated areas (excluding wetlands) with native seed mix. • Take care to avoid spreading invasive species (especially invasive plant 	No residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
		<p>species) that occur in or adjacent to work areas, and crews will be educated on the importance of preventing the spread of invasive species.</p> <ul style="list-style-type: none"> • Abide by the <i>Invasive Species Act</i> regulations. • Remove and properly dispose of invasive plant material, where feasible. • Inspect and clean equipment and vehicles as necessary prior to entering/leaving vegetated work areas, to reduce potential for spreading invasive species propagules. 	
Fish Habitat	Disturbance to fish habitat, including Spawning Beds, as a result of activities (e.g., water crossings, vegetation loss, soil erosion) during the construction phase.	<ul style="list-style-type: none"> • Avoid watercourse crossings during construction to the extent feasible by using existing access and crossings (e.g., bridges) and by accessing structures from either side of each watercourse, where feasible. • Develop an erosion and sediment control plan, which will include mitigation measures such as constructing access roads during low flow conditions, retaining stream bank vegetation, and storing materials away from water. • Do not permit refuelling of vehicles and/or equipment away from watercourses to avoid potential spills (e.g., fuel, oil, lubricant) from migrating and entering aquatic features or riparian areas. • Select appropriate crossing types and acquire necessary permits and approvals prior to crossing construction. Adhere to terms and conditions of permits and approvals. • In-water works will conform to applicable MNR fish timing windows. • Construct access roads during low water flow conditions, where feasible. • Retain stream bank vegetation as long as possible prior to crossing construction. Retain shrubby bank vegetation where feasible. • Install sediment traps, silt fences and other mitigation measures as necessary. 	Negligible residual effects are predicted

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
		<ul style="list-style-type: none"> • Restore disturbed areas to a pre-disturbed state or better, where feasible. 	
Woodlands	Loss of woodlands during the construction phase.	<ul style="list-style-type: none"> • Take forested land into account when planning access for construction. • Retain, salvage or fell trees as appropriate. • Obtain tree removal permits from the City of Barrie and Township of Springwater, as needed, and undertake compensatory plantings, as required. 	Negligible residual effects are predicted
Species at Risk (SAR)	Disturbance or loss of SAR as a result of habitat loss from construction activities.	<ul style="list-style-type: none"> • Avoid SAR and their habitat, if possible. • Avoid areas for construction laydown and clearing of vegetation if plant SAR are identified. • Make construction personnel aware of the potential presence of, and able to identify, SAR known to occur within the work areas such as bobolink. • Avoid vegetation removal during the migratory bird breeding season - April 5 to August 31 in nesting zone C2 to the extent feasible (ECCC 2017c). Undertake a non-intrusive breeding bird nest survey if vegetation removal is required during this period. Implement protective measures (e.g., buffers) as described in the general habitat descriptions for these species should nest sites of these species be identified. • Assess the required works to determine the potential for modification of the work, schedule or mitigation measures to avoid potential effects on SAR and their habitat should other SAR or their habitat be encountered during construction activities. Communicate with the MNRF. • Report new SAR observations to the appropriate MNRF District Office. • Cease work activities if a SAR is harmed or killed as a result of the work being carried out, and the appropriate MNRF District Office will be notified 	No residual effects are predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
Wildlife Habitat	Disturbance to wildlife during activities in the construction phase.	<ul style="list-style-type: none"> • Retention of snags and cavity trees where feasible. • General avoidance of wetlands, if possible. • Promotion of wildlife habitat through vegetation control. • Retention of natural vegetation, where possible. • Use of native plant species where seeding or planting is completed. 	No residual effects are predicted.
Habitat Breeding Grounds	Disturbance during the construction phase.	<ul style="list-style-type: none"> • Avoid tree removal in wooded areas during nesting season where feasible. <p>Conduct a non-intrusive breeding bird survey if clearing is to be undertaken during the breeding season. Protect active nests until the young have fledged.</p> <ul style="list-style-type: none"> • Retain natural vegetation, where possible. Use native species where seeding or planting is carried out. • Retain snags for wildlife management, where feasible. 	No residual effects are predicted.
EFFECTS TO RECREATIONAL RESOURCES			
Recreational resources	Disturbance to recreational trails during construction.	<ul style="list-style-type: none"> • Erect clear signage in areas impacted by construction. • Provide notification to residents and interest groups (e.g., snowmobiling clubs) detailing construction schedules and routes. • Sites will be restored (e.g., grass seeding), where feasible, to minimize long-term visual and environmental impacts to recreational areas. 	No residual effects are predicted.
EFFECTS TO VISUAL AND AESTHETIC RESOURCES			
Appearance of the landscape	<p>Visual disruption will occur during project construction.</p> <p>Public views of the transmission right-of-way from adjacent properties and surrounding</p>	<ul style="list-style-type: none"> • The project is located in an existing transmission right-of-way to minimize effects to the landscape; the area is already disturbed and the proposed Project will not significantly alter or reduce landscape. • Visual effects on neighboring properties can be managed by maintaining a clean and organized workspace. 	Low to negligible residual effects predicted.

ENVIRONMENTAL CONCERN	PROJECT PHASE & POTENTIAL EFFECTS	MITIGATION MEASURES	RESIDUAL EFFECT
	residential, commercial, and industrial neighbourhoods.	<ul style="list-style-type: none"> • Disposal of all non-salvageable limbs by chipping or removal to designated areas. • Stumps will be cut flush with the ground where feasible. • Topsoil and grass seed will be used to restore disturbed areas. <p>Existing two lines of wood pole structures will be replaced with one line of steel lattice structures, reducing the width of the right-of-way.</p>	

8 Effects Monitoring

The purpose of effects monitoring is to confirm the extent of the project's environmental effects, by comparing the actual effects with the predicted effects, to verify the effectiveness of implemented mitigation measures, and to determine whether additional measures are warranted. Monitoring also confirms that the commitments, conditions of approval, where applicable, and compliance with other environmental legislation are met. An Environmental Specialist will be assigned to the proposed Project for the duration of construction to monitor construction activities and provide guidance on needed field changes.

As previously noted in section 6, a project-specific Environmental Specification will be prepared following the completion of the Class EA process. The Environmental Specification will:

- Summarize legislative requirements;
- Summarize environmental commitments set out in the final ESR, and terms and conditions of approval, if any; and
- Provide specific directions to construction personnel.

At the end of construction, an as-constructed plan will be prepared to guide ongoing operation and maintenance activities. The plan will document as-constructed conditions, as well as any ongoing monitoring requirements.

9 Conclusion

Hydro One conducted a Class EA under the EA Act for the upgrade of the transmission lines and structures along the existing transmission right-of-way between Essa TS located in the Township of Springwater and Barrie TS in the City of Barrie, and upgrade/replacement of equipment at the stations. The proposed Project is required to replace equipment that has reached its end of life as well as to provide additional capacity to meet the region's forecasted increase in electricity demand.

Potential short- and long-term environmental effects were identified for the proposed Project and corresponding mitigation measures were developed to address these effects. Based on the project design and implementation of the proposed mitigation measures, no significant adverse residual effects are expected.

Hydro One has conducted comprehensive consultation to inform First Nation communities, municipal and provincial government officials and agencies, potentially affected and interested persons and interest groups about the proposed Project as well as to identify and resolve potential concerns. The consultation process included PICs, which provided opportunities for interested parties to discuss with and pose questions to the Hydro One project team and complete comment forms; correspondence with property owners; meetings with key stakeholders; and establishment and maintenance of a project website.

The draft ESR was made available for First Nation communities, municipal and provincial government officials and agencies, potentially affected and interested persons and interest groups to review for 30 calendar days, from January 29 to February 27, 2018. Hydro One responded and made best efforts to resolve issues raised by concerned parties during the review period. Comments received during this period have been documented in this ESR, as required by the Class EA process.

The proposed Project will be implemented in full compliance with the requirements of the Class EA process as outlined in this ESR, incorporating input obtained throughout the planning process including the consultation process. Hydro One will obtain the necessary environmental approvals and permits required for the proposed Project.

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